ORDER NO. ARD82060152A4-01

Service Manual

Cassette Deck

RS-M255X

(Silver Face)

dbx* Equipped Cassette Deck with
Electronic Multi-Mode Counter

** DOLBY SYSTEM

This is the Service Manual for the following areas.
F ········ For Asian PX.
J ········ For European PX.

RS-M250 MECHANISM SERIES

NOTE:
For the products (RS-M255X) delivered to PX, please refer to the table below and the attached Service Manual, since their parts are the same as those of the silver type products delivered to Asia, Latin America, the Middle East and Africa (regions marked N in the Service Manual) except for the parts listed in the table.

PARTS COMPARISON TABLE:

Please revise the original parts list in the Service Manual RS-M255X (of the silver type model for N mark areas) to conform to the changes shown herein.
If new part numbers are shown, be sure to use them when ordering parts.

Ref. No.	Part Name & Description	Part Numbers		Remarks
		N ··· For Asia, Latin America, Middle East and Africa areas. "Silver Type"	F ··· **For Asian PX.** J ··· **For European PX.** **"Silver Type"**	
G35	Main Name Plate	QGS2985	QGS3036	
A2	Instruction Book	QQT3266	QQT3357	
P1	Inside Carton	QPN4290	QPN4306	

* The term dbx is a registered trademark of dbx Inc.
** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

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Service Manual

Cassette Deck

RS-M255X

(Silver Face
Black Face)

dbx Equipped Cassette Deck with
Electronic Multi-Mode Counter

DOLBY SYSTEM

This is the Service Manual for the following areas.
[N] ……… For Asia, Latin America, Middle East and Africa areas.
[A] ……… For Australia.

- Please use this manual together with the service manual for model No. RS-M255X (original) order No. ARD82010116C2-29.
- For schematic diagrams, circuit board (Voltage Regulator Circuit Board), wiring connection diagram (Power Supply) and parts lists, refer to the ones in this Service Manual.
  For other information, refer to both this Service Manual and the original Service Manual.

RS-M250 MECHANISM SERIES

Specifications

Track system: 4-track 2-channel stereo recording and playback
Tape speed: 4.8cm/s (1-7/8ips)
Wow and flutter: 0.038% (WRMS)
Frequency response: Metal tape; 20 – 20,000 Hz
30 – 17,000 Hz ±3 dB
CrO$_2$ tape; 20 – 19,000 Hz
30 – 16,000 Hz ±3 dB
Normal tape; 20 – 18,000 Hz
30 – 15,000 Hz ±3 dB
Dynamic range: 110 dB (at 1 kHz) with dbx in
Max. input level improvement: 10 dB or more improved with dbx in (at 1 kHz)
Signal-to-noise ratio: dbx* in; 92 dB
Dolby** NR in; 68 dB (above 5 kHz)
Dolby NR out; 58 dB (signal level = max. input level A weighted, CrO$_2$ type tape)

Fast forward and rewind time: Approx. 90 seconds with C-60 cassette tape
Inputs: MIC; sensitivity 0.25 mV, applicable microphone impedance 400Ω – 10 kΩ
LINE; sensitivity 60 mV, input impedance 47 kΩ
Outputs: LINE; output level 700 mV, load impedance 22 kΩ over
HEADPHONES; output level 125 mV (at 8Ω)
Bias frequency: 85 kHz
Motor: 2-motor system
Heads: 2-head system
1-SX (Sendust Extra) head for record/playback
1-double-gap ferrite head for erasure
Power requirement: AC; 110/125/220/240 V, 50-60 Hz
preset power voltage 240 V
Power consumption: [N] …… 18 W
[A] …… 28 W
Dimensions: 43.0 cm (W) × 10.8 cm (H) × 33.1 cm (D)
Weight: 6.0 kg

Specifications are subject to change without notice.
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NOTES: RESISTORS
ERD……Carbon
ERG……Metal-oxide
ERS……Metal-oxide
ERO……Metal-film
ERX……Metal-film
ERQ……Fuse type metallic
ERC……Solid
ERF……Cement

CAPACITORS
ECBA ……Ceramic
ECG□ ……Ceramic
ECK□ ……Ceramic
ECC□ ……Ceramic
ECF□ ……Ceramic
ECQM ……Polyester film
ECQE ……Polyester film
ECQF ……Polypropylene
ECE□ ……Electrolytic
ECE□N …Non polar electrolytic
ECQS ……Polystyrene
ECS□ ……Tantalum
QCS ……Tantalum

REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

RESISTORS

Ref. No.	Part No.
R 1, 2	ERD25TJ273
R 3, 4	ERD25TJ474
R 5, 6	ERD25FJ471
R 7, 8	ERD25FJ332
R 9, 10	ERD25FJ680
R 11, 12	ERD25FJ103
R 13, 14	ERD25TJ334
R 15, 16	ERD25FJ472
R 17, 18	ERD25FJ562
R 19, 20	ERD25TJ225
R 21, 22	ERD25FJ332
R 23, 24	ERD25TJ225
R 25, 26	ERD25FJ101
R 29, 30	ERD25FJ103
R 31, 32	ERD25FJ681
R 33, 34	ERD25FJ100
R 35, 36	ERD25FJ182
R 37, 38	ERD25FJ472
R 39	ERD25FJ561
R 40	ERD25FJ822
R 41, 42	ERD25TJ123
R 43, 44	ERD25FJ151
R 45, 46	ERD25FJ102
R 47, 48	ERD25TJ274
R 49, 50, 51, 52	ERD25TJ105
R 53, 54	ERD25TJ473
R 55, 56	ERD25FJ332
R 57, 58	ERD25TJ274
R 59, 60	ERD25TJ184
R 61, 62	ERD25FJ332
R 63, 64	ERD25FJ181
R 65, 66	ERD25FJ101
R 67, 68	ERD25TJ223
R 69, 70	ERD25TJ154
R 71, 72	ERD25FJ102
R 73, 74	ERD25FJ392
R 75, 76	ERD25FJ681
R 77, 78	ERD25FJ820
R 79, 80	ERD25FJ392
R 81, 82, 83, 84	ERD25FJ152
R 85, 86	ERD25FJ270
R 87, 88	ERD25FJ562
R 89, 90	ERD25FJ682
R 91, 92	ERD25FJ821
R 93, 94	ERD25TJ473
R 95, 96	ERD25FJ820
R 97, 98	ERD25FJ560
R 101	ERD25FJ222
R 102	ERD25TJ224
R 103	ERD25TJ473
R 104	ERD25TJ563
R 105	ERD25FJ472
R 106	ERD25TJ473
R 107	ERD25TJ273
R 108	ERD25FJ472
R 109, 110	ERD25TJ473
R 111	ERD25TJ104
R 112, 113, 114, 115	ERD25TJ473
R 116	ERD25FJ562
R 117	ERD25TJ223
R 118	ERD25TJ224
R 119	ERD25FJ152
R 120	ERD25TJ273
R 121, 122, 123	ERD25TJ473
R 124	ERD25TJ104
R 125	ERD25FJ101
R 126	ERD25FJ821
R 127, 128	ERD25FJ391
R 129	ERD50FJ560
R 130	ERD25FJ103
R 131	ERD25TJ104
R 132	ERD25TJ183
R 133, 134, 135	ERD25TJ274
R 136	ERD25TJ223
R 137	ERD25TJ123
R 138	ERD25FJ562
R 139	ERD25FJ100
R 140	ERD25FJ562
R 141	ERD25FJ1R0
R 142	ERD25FJ822
R 143	ERD25TJ154
R 144	ERD25TJ124
R 145	ERD25TJ473
R 146	ERD25FJ332
R 147	ERD25FJ103
R 148	ERD25FJ332
R 149	ERD25FJ222
R 150	ERD25FJ822
R 151	ERD25TJ154
R 152	ERD25TJ563
R 153	ERD25FJ471
R 154	ERD25FJ122
R 155, 156	ERD25FJ102
R 157, 158	ERD25TJ183
R 159, 160	ERD25FJ102
R 161	ERD25TJ223
R 162	ERD25FJ101
R 163, 164	ERD25TJ123
R 165, 166	ERD25FJ562
R 167	ERD25FJ100
R 168, 169	ERD25FJ102
R 170	ERD25FJ821
R 171	ERQ12HJ100
R 201, 203	ERD25TJ104
R 205, 206	ERD25FJ101
R 207, 208	ERD25TJ474
R 209, 210	ERD25TJ105
R 211, 212	ERD25TJ124
R 213, 214	ERD25TJ473
R 215, 216	ERD25FJ472
R 217, 218	ERD25TJ473
R 219, 220	ERD25TJ333
R 221, 222	ERD25FJ103
R 223, 224	ERD25TJ473
R 225, 226	ERD25FJ470
R 227, 228	ERD25TJ124
R 229, 230	ERD25FJ332
R 231, 232	ERD25TJ473
R 233, 234, 235, 236	ERD25TJ104
R 237, 238	ERD25FJ103
R 239, 240	ERD25TJ333
R 241	ERD25FJ102
R 242	ERD25FJ102
R 243, 244	ERD25TJ473
R 245, 246	ERD25FJ101
R 247, 248	ERD25TJ473
R 249, 250	ERD25FJ103
R 251, 252	ERD25FJ102
R 253, 254	ERD25FJ392
R 255, 256	ERD25TJ333
R 257, 258	ERD25TJ104
R 259, 260	ERD25FJ472
R 261, 262	ERD25TJ333
R 263, 264	ERD25FJ682
R 265, 266	ERD25FJ472
R 267, 268	ERD25FJ220
R 269, 270	ERD25TJ393
R 271, 272	ERD25TJ473
R 273, 274	ERD25FJ332
R 275, 276	ERD25TJ333
R 277, 278	ERD25TJ394
R 279, 280	ERD25FJ102
R 281, 282	ERD25FJ8R2
R 283, 284	ERD25TJ333
R 285	ERD25FJ103
R 287	ERD25FJ392
R 289, 290	ERD25FJ103
R 291, 292	ERD25TJ155
R 301, 302, 303, 304	ERD25FJ471
R 305	ERD50FJ221
R 306, 307	ERD25TJ473
R 309	ERD25TJ223
R 310	ERD25TJ104
R 311	ERD25TJ473
R 312	ERD25FJ183
R 314	ERD25FJ182
R 315	ERD25FJ102
R 316	ERD25FJ103
R 317	ERD25FJ472
R 318	ERD25FJ472
R 319	ERD25TJ154
R 320	ERD25TJ154
R 321, 322	ERD25TJ683
R 323, 324	ERD25TJ563
R 325, 326	ERD25TJ224
R 327, 328	ERD25FJ222
R 329	ERD25FJ100
R 330	ERD25FJ562
R 331	ERD25FJ562
R 332	ERD25TJ473
R 333	ERD25TJ104
R 334	ERD25TJ224
R 335	ERD25TJ473
R 336	ERD25FJ332
R 337, 338	ERD25TJ684
R 339, 340	ERD25FJ562
R 401 ⚠	ERD25FJ102
R 402	[N] ⚠ ERQ12HJ2R7 [For Asia, Latin America, Middle East and Africa areas.] [A] ⚠ ERX12ANJ2R7 [For Australia.]
R 403 ⚠	ERD25FJ102
R 404	[N] ERD25FJ821 [For Asia, Latin America, Middle East and Africa areas.] [A] ERD25FJ471 [For Australia]
R 405	[A] ERD25FJ391 [For Australia.]
R 406	ERD25FJ332
R 407	ERD25FJ472
R 408	ERD25FJ103
R 409 ⚠	ERD25FJ102
R 410	[N] ⚠ ERQ12HJ2R7 [For Asia, Latin America, Middle East and Africa areas.] [A] ⚠ ERX12ANJ2R7 [For Australia.]
R 411 ⚠	ERD25FJ102
R 412	ERD25FJ103
R 413	ERD25TJ823
R 414 ⚠	ERX2ANJ5R6
R 415	[N] ⚠ ERD25FJ182 [For Asia, Latin America, Middle East and Africa areas.] [A] ⚠ ERD25FJ102 [For Australia]
R 416	ERD25FJ103
R 417	[A] ⚠ ERD25FJ821 [For Australia.]
R 418	[N] ERD25FJ821 [For Asia, Latin America, Middle East and Africa areas.] [A] ERD50FJ331 [For Australia.]
R 419	[A] ERD25FJ121 [For Australia.]
R 420	[N] ERD25FJ821 [For Asia, Latin America, Middle East and Africa areas.] [A] ERD50FJ331 [For Australia.]
R 421	ERD25TJ104
R 422	ERD25TJ223
R 423	ERD25TJ123
R 424	ERD25FJ560
R 425, 426	[N] ERD50FJ181 [For Asia, Latin America, Middle East and Africa areas.] [A] ERD50FJ271 [For Australia.]
R 428	[A] ERD25FJ392 [For Australia.]
R 429	[A] ERD25FJ562 [For Australia.]
R 430[A]	ERD25TJ683 [For Australia.]
R 501, 502, 503, 504, 505	ERD25TJ473
R 506	ERD25FJ331
R 507	ERD25FJ271
R 508	ERD25FJ331
R 509	ERD25FJ271
R 510	ERD25FJ331
R 511	ERD25FJ271
R 512	ERD25TJ104
R 513	ERD25TJ223
R 514	ERD25FJ562
R 515	ERX12ANJR47
R 516	ERD25FJ1R5
R 517	ERD25FJ222
R 523	ERD25FJ222
R 524	ERD25FJ102
R 525	ERD25FJ272
R 526	ERD25FJ562
R 527	ERD25FJ471
R 701	ERD25FJ222
R 702	ERD25FJ221
R 703	ERD25FJ331
R 704	ERD25FJ102
R 705, 706	ERD25FJ821

VARIABLE RESISTORS

Ref. No.	Part No.
VR 1, 2	EWJ5SAF22A24
VR 3, 4	QWKGTA024A54
VR 5, 6	EVNM4AA00B24
VR 7, 8, 9, 10	EVNM4AA00B15
VR 201, 202, 203, 204	EVNM0AA00B54
VR 205, 206, 207, 208	EVNM0AA00B14
VR 301	EVNM4AA00B24
VR 302	EVNM4AA00B53
VR 501	EVNK4AA00B14

CAPACITORS

Ref. No.	Part No.
C 1, 2	ECEA1HS100
C 3, 4	ECFDD103KXY
C 5, 6	ECEA50Z1
C 7, 8	ECEA50ZR47
C 9, 10	ECKD1H681KB
C 11, 12	ECEA1AS221
C 13, 14	ECQM1H123JZ
C 15, 16	ECCD1H181K
C 17, 18	ECQM1H152JZ
C 19, 20	ECQM1H123JZ
C 21, 22, 23, 24	ECEA50Z1
C 25, 26	ECKD1H392KB
C 27, 28	ECEA1AS470
C 29, 30	ECEA50M1R
C 31, 32	ECKD1H103ZF
C 33, 34	ECEA16M10R
C 35, 36	ECEA1AS221
C 37, 38	ECQV05334JZ
C 39, 40	ECQM1H392JZ
C 41, 42	ECQM1H472JZ
C 43, 44	ECEA1HS100
C 45, 46	ECQM1H273JZ
C 47, 48	ECEA50MR33R
C 49, 50	ECQM1H104JZ
C 51, 52	ECEA1HS100
C 53, 54	ECFDD473KXY
C 55, 56	ECEA1AS471
C 57, 58	ECQM1H562JZ
C 59, 60	ECQV05224JZ
C 61, 62, 63, 64	ECEA1HS100
C 65, 66	ECEA25N3R3
C 67, 68	ECQV05154JZ
C 69, 70	ECEA50Z1
C 71, 72	ECEA50Z2R2
C 73, 74	ECQM1H273JZ
C 75, 76	ECQM1H682JZ
C 77, 78	ECQM1H153JZ
C 79, 80	ECQM1H333JZ
C 81, 82	ECQM1H683JZ
C 83	ECEA1CS221
C 84	ECEA1CS471
C 85, 86	ECQV0568JZ
C 87, 88	ECEA1ES220
C 89, 90	ECKD1H102KB
C 91, 92	ECQM1H392JZ
C 93, 94	ECKD2H121KB
C 95, 96	ECCD1H101KC
C 97	ECEA1AS101
C 98	ECEA1HS100
C 99	ECEA50ZR47
C 100	ECEA1HS100
C 101, 102	ECEA1CS330
C 103, 104	ECFDD223KXY
C 105, 106	ECEA1HS100
C 107	ECEA1HF100
C 108	ECQM1H822KZ
C 109	ECKD1H103ZF
C 110	ECFDD153KXY
C 111	ECQP1153JZ
C 112	ECEA1HSR33
C 113	ECEA50Z1
C 114	ECEA50ZR22
C 115	ECEA1HS100
C 116	ECEA25Z4R7
C 117	ECEA1CS330
C 118, 119	ECQM1H104JZ
C 120	ECKD1H103ZF
C 121, 122	ECKD1H223ZF
C 123, 124	ECEA1HS100
C 125, 126	ECCD1H221K
C 127, 128	ECKD1H103ZF
C 129, 130	ECKD1H472MD
C 131	ECKD1H103ZF
C 132, 133	ECKD1H223ZF
C 135, 136	ECQM1H152JZ
C 137, 138	ECKD1H102KB
C 141, 142, 147	ECKD1H223ZF
C 148	ECKD1H392KB
C 201, 202	ECEA25Z4R7
C 203, 204	ECEA50Z1
C 205, 206, 207, 208	ECQV05104JZ
C 209, 210	ECQV05334JZ
C 211, 212	ECCD1H221K
C 213, 214	ECQM1H103JZ
C 215, 216	ECCD1H101KC
C 217, 218	ECQM1H103JZ
C 219, 220	ECCD1H101KC
C 221, 222, 223, 224	ECEA25Z4R7
C 225, 226, 227, 228	ECQV05104JZ
C 229, 230, 231, 232	ECQM1H332JZ
C 233, 234	ECCD1H331K
C 235, 236	ECQV05104JZ
C 237, 238	ECQM1H103JZ
C 239, 240	ECQM1H102JZ
C 241, 242	ECEA16M10R
C 243, 244	ECEA1HS100
C 245	ECQM1H102JZ
C 247, 248	ECEA1ES470
C 249, 250	ECCD1H151KC
C 301	ECFD104KXY
C 302	ECFDD223KXY
C 303, 304	ECEA50Z1
C 305, 306	ECEA50ZR47
C 307, 308	ECEA1HS100
C 309	ECEA1ES101
C 310	ECFDD473KXY
C 311	ECKD1H682MD
C 401 ⚠	ECEA1ES332
C 402 ⚠	ECEA1ES101
C 403	ECKD1H103ZF
C 404	ECEA1ES220
C 405	ECEA1CS331
C 406	ECKD1H103ZF
C 407 ⚠	ECEA1ES222
C 408 ⚠	ECEA1ES101
C 409	ECKD1H103ZF
C 410	ECEA50Z1
C 411	ECEA1CS331
C 412	ECKD1H103ZF
C 413 [A]	ECQP1103JZ [For Australia.]
C 414 ⚠	ECEA1CS471
C 415, 416 ⚠	ECEA1CS472
C 417, 418 ⚠	ECEA1HS100
C 419	ECKD1H103ZF
C 420 [A]	ECQP1103JZ [For Australia.]
C 421	ECEA1ES470
C 422	ECEA1ES220
C 423	ECEA1ES470
C 424	ECEA1ES220
C 425, 426	ECFDD104KZY
C 427	ECEA50Z3R3
C 428, 430	ECFDD104KZY
C 431 ⚠	ECEA1CS472
C 435	ECKD1H103ZF
C 502	ECKD1H102MD
C 503	ECCD1H331K
C 504	ECEA1AS221
C 505	ECKD1H332ZF
C 506	ECEA50ZR2R2
C 507	ECKD1H222MD
C 508	ECEA1CN100
C 511	ECEA50ZR1
C 702	ECCD1H390JC
C 703	ECCD1H101JC
C 704	ECCD1H470JC
C 705	ECKD1H102KB

COMBINATION PARTS

Ref. No.	Part No.
Z 501	EXBEQ5273K
Z 502	EXBD86181K
Z 503	EXBEQ4272K
Z 504	QCRFWA1
Z 505	EXFP4472Z
Z 506	EXBD8825K
Z 507	EXRP152K473T

TRANSISTORS

Ref. No.	Part No.
Q 1, 2	2SD636
Q 3	2SB641
Q 11, 12, 13, 14	2SK104F
Q 15, 16	2SD965
Q 17, 18	2SD965
Q 19	2SA921S
Q 21, 22, 23	2SD1011S
Q 25	2SB643
Q 26	2SD946
Q 27	2SD592NCR
Q 28, 29, 30, 31	2SD636
Q 32	2SB641
Q 33, 34, 35, 36, 37, 38, 39, 41, 42	2SD636
Q 201, 202	2SK104F
Q 203, 204	2SD636
Q 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220	2SD1010
Q 221, 222, 223	2SD636
Q 225	2SB641
Q 227	2SD636
Q 301, 302	2SD636
Q 303, 304	2SB641
Q 401	2SD836
Q 402	2SC945Q
Q 403	2SA564
Q 404	2SB895
Q 405	2SD946
Q 406 [A]	2SC945P
[For Australia.]	
Q 407	2SD592NCR
Q 408	2SA683
Q 501, 502, 503, 504, 505	2SB643
Q 506	2SD636
Q 508	2SD965

DIODES & RECTIFIERS

Ref. No.	Part No.
D 1, 2, 11, 12, 13, 14, 15	MA161
D 16	RVDRD6R2EB
D 17, 18, 19, 20, 21, 22, 201, 202, 203, 204, 301, 302, 303, 305, 306	MA161
D 401, 402, 403, 404, 405, 406, 407, 408, 409 ⚠	SM112
D 410, 411	MA1056
D 412, 413	MA161
D 414, 415	MA1150
D 416	MA1033
D 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514	MA161
D 515	LN41YPHL
D 516	LN31GPHL
D 517	LN21RPHL
D 702	TLR208
D 703	TLG208
D 704	TLY208

INTEGRATED CIRCUITS

Ref. No.	Part No.
IC 1, 2	AN6212
IC 3, 4	NE646N
IC 5, 6	AN6213
IC 7	AN6256
IC 8	AN6214
IC 9	BA336
IC 201, 202	UPC1252H
IC 203, 204	UPC1253H2
IC 205, 206	NJM4558DF
IC 301	AN6870N
IC 302, 303	AN6280
IC 304	NJM4556D
IC 305	BA6138
IC 501	MN1405RH
IC 502	AN6270
IC 503	DN6838
IC 701	M54816P

ELECTRICAL PARTS

Ref No.	Part No.	Part Name & Description
E 1	QWY4123Z	Record/Playback Head
E 2	QWY2138Z	Erase Head
E 3		
[N] ⚠	RJA52YAK	AC Power Cord
[For Asia, Latin America, Middle East and Africa areas.]		
[A] ⚠	SJA23	AC Power Cord
[For Australia.]		
E 4 [N]	QTD1129	Cord Bushing
[For Asia, Latin America, Middle East and Africa areas.]		
[A]	QTD1164	Cord Bushing
[For Australia.]		
E 5	QMA4402	dbx P.B. Holder
E 6	XTN3 + 16B	Tapping Screw ⊕3 × 16
E 7	XTN3 + 10B	Tapping Screw ⊕3 × 10
E 8	XTN3 + 8B	Tapping Screw ⊕3 × 8
E 9	XTS3 + 12B	Tapping Screw ⊕3 × 12
E 10	XTB3 + 10BFN	Tapping Screw ⊕3 × 10
E 11	QTD1181	Wire Clamper
E 12	QEJ5003S	Jack Board
E 13	QJP1921TN	3 Pin Post
E 14	QJP1922TN	6 Pin Post
E 15	QJP1923TN	9 Pin Post
E 16	QJP1924TN	12 Pin Post
E 17	QJS1924TNL	12 Pin Socket
E 18		
[N] ⚠	QCR0008	Spark Killer
[For Asia, Latin America, Middle East and Africa areas.]		
[A] ⚠	QCR0011	Spark Killer
[For Australia.]		
E 19	SJT777	Pin Terminal
E 20	XTN3 + 8B	Tapping Screw ⊕3 × 8
E 21	QMA4364	Switch Angle
E 22	XSN3 + 8S	Screw ⊕3 × 8
E 23	XWA3B	Washer
E 24		
[N] ⚠	QTF1007	Fuse Holder
[For Asia, Latin America, Middle East and Africa areas.]		
[A] ⚠	QTF1054	Fuse Holder
[For Australia.]		
E 25	QJS12001T	12 Pin Socket
E 26	XTN3 + 10B	Tapping Screw ⊕3 × 10
E 27	QJT0015	Lug Terminal
E 28	QTH1164	Heat Sink
E 29	XSN3 + 8S	Screw ⊕3 × 8
E 30	XWA3B	Washer 3ϕ
E 31	XWE3	Washer 3ϕ
E 32	N024B	Insulator Plate
E 33	N018E	Insulator Plate
E 34	QSIFM004F	FL Meter
E 35	QJT1067	Check Pin
E 36	QKJ0520	LED Holder-A
E 37	QJS15001T	15 Pin Socket
E 38	QKJ0521	LED Holder-B
E 39	QJC0050	Earth Plate
E 40	QMA4365	Timer Angle
E 41	XTN3 + 6B	Tapping Screw ⊕3 × 6
E 42	XAMQ44P300	Pilot Lamp
E 43	QJS06001T	6 Pin Socket
E 44	QJP06S001T	6 Pin Post
E 45	QJP12L001T	12 Pin Post (L-type)
E 46	QJP15L001T	15P Post (L-type)
E 47	QNQ1070	Nut
E 48	QNQ1039	Nut
E 49	QNQ1004	Nut
E 50	QJS1923TN	9 Pin Socket
E 51	QJS1922TN	6 Pin Socket
E 52	QJS1921TN	3 Pin Socket
E 53	QJT1054	Contact
E 54	XTN3 + 10BFN	Tapping Screw ⊕3 × 10
E 55	QJi1466RR	Leaf Switch Circuit Board
E 56	QJT1089	Contact

RESONATOR

Ref No.	Part No.	Part Name & Description
X 701	QZE0049	Crystal

COILS

Ref No.	Part No.	Part Name & Description
L 1, 2	QLQX0332KWA	Peaking Coil
L 3, 4	QLQX0343KWA	Bias Trap Coil
L 5, 6	QLM9Z9K	MPX Filter
L 8	QLQX0332KWA	Peaking Coil
L 501	ELEH101KA	Choke Coil
L 502, 503	QLQZ1014D	Choke Coil

TRANSFORMERS

Ref No.	Part No.	Part Name & Description
T 1	QLB0198K	Bias Oscillation Coil
T 401 ⚠	QLPN74EMX	AC Power Transformer

FUSES

Ref No.	Part No.	Part Name & Description
F 1		
[N] ⚠	XBA2E05NS5	Fuse (T 500mA)
[For Asia, Latin America, Middle East and Africa areas.]		
F 1, 2		
[A] ⚠	XBAQ0008	Fuse (T 630mA)
[For Australia.]		
F 3		
[A] ⚠	XBAQ125028	Fuse (T 1.25A)
[For Australia.]		
F 4, 5		
[A] ⚠	XBA0006	Fuse (T 315mA)
[For Australia.]		

SWITCHES

Ref No.	Part No.	Part Name & Description
S 1	QSR8402	Rotary Switch (NR Selector)
S 401 ⚠	QSW1117AS	Push Switch (Power ON/OFF)
S 402 ⚠	QSR1407	Rotary Switch (Voltage Selector)
S 501, 502, 503, 504, 505, 506, 507, 508	QSW1118	Key Board Switch
S 509, 510, 511, 512	QSWY409	Push Switch
S 513	QSS1303	Slide Switch (Timer Switch)
S 601	QSB0260	Leaf Switch (Erase Safety Switch)
S 602	QSB0260	Leaf Switch (Mode Sensing Switch)
S 603	QSB0261	Leaf Switch (Stop Switch)
S 604	QSB0260	Leaf Switch (Playback Switch)
S 605	QSB0261	Leaf Switch (Half Detection Switch)
S 606, 607	QSB0266	Leaf Switch (Auto Tape Selector)

JACKS

Ref No.	Part No.	Part Name & Description
J 1	QJA0259	Headphones Jack
J 2	QJA0262	Microphone Jack

MECHANICAL PARTS

Ref No.	Part No.	Part Name & Description
M 1	QMA4330	Flywheel Retainer
M 2	QBP1894	Head Base Plate Spring
M 3	QBP1895	Cassette Pressure Spring
M 4	QXG1059	Main Gear
M 5	QDR1146	Supply Reel Table
M 6	QMB1336	Reel Table Hub
M 7	QML3655	Cam Follower
M 8	QML3660	Idler Select Lever
M 9	QML3661	Erase Safety Lever
M 10	QMZ1283	Flywheel Thrust Retainer
M 11	QDB0306	Capstan Belt
M 12	QDB0287	Reel Motor Belt
M 13	QDK1012	Steel Ball
M 14	QBW2008	Snap Washer
M 15	QBW2046	Snap Washer
M 16	QBN1772	Erase Safety Lever Spring
M 17	QBT1725	Lock Lever Spring
M 18	QBT1927	Head Base Plate Spring
M 19	QBT1920	Idler Spring
M 20	QBC1373	Reel Table Spring
M 21	XTN2 + 6B	Tapping Screw ⊕2 × 6
M 22	XTN26 + 6BFZ	Tapping Screw ⊕2.6 × 6
M 23	XTN3 + 24B	Tapping Screw ⊕3 × 24
M 24	XUB4FT	Stop Ring
M 25, 26	XTN3 + 10B	Tapping Screw ⊕3 × 10
M 27	XTN26 + 8B	Tapping Screw ⊕2.6 × 8
M 29	QXD0120	Takeup Reel Table Assembly
M 30	QMK1867	Head Base Plate
M 31	QMZ1252	Head Spacer
M 32	QBC1103	Head Spring
M 33	XSN2 + 16	Screw ⊕2 × 16
M 34	XWG2	Washer 2ϕ
M 35	QXA1232	Brake Plunger Assembly
M 36	QML3865	Plunger Lever
M 37	QBT1955	Plunger Spring
M 38	QXA1222	Side Angle Spring
M 38-1	QBT1755	Side Angle Spring
M 39	QXA1076	Trigger Plunger Assembly
M 40	QML3651	Trigger Plunger Lever
M 41	QML3653	Control Lever
M 42	QBT1278	Record Lock Lever Spring
M 45	QXU0280	Capstan Motor Assembly
M 46	QXA1077	Motor Retainer Assembly
M 47	QDB0286	Takeup Belt
M 48	QXP0621	Takeup Pulley
M 49	XSN26 + 3	Screw ⊕2.6 × 3
M 50	QXU0250	Reel Motor Assembly
M 51	QBN1878	Holder Spring
M 52	QBP1946	Cassette Lock Spring
M 53	QXL1406	Pressure Roller Lever
M 53-1	QBN1771	Pressure Roller Spring
M 54	QMN2625	Eccentric Pin
M 55	QXL1423	Idler Lever Assemlbly
M 56	QXi0116	Takeup Idler
M 57	QXL1408	Swing Gear Lever Assembly
M 58	QXL1409	Fast Wind Arm Assemlby
M 59	QML3659	Brake Lever
M 60	QBG1132	Brake Rubber
M 61	QXL1411	Lock Lever Assembly
M 62	QXF0190	Flywheel Assembly
M 63	QMA4358	Center Angle
M 64	QMA4359	Side Angle-R
M 65	XTN3 + 8B	Tapping Screw ⊕3 × 8
M 66	XTN26 + 6BFZ	Tapping Screw ⊕2.6 × 6
M 68	XTN26 + 10B	Tapping Screw ⊕2.6 × 10
M 69	QXH0390 "Silver Type"	Mechanism Cover
	QXH0390K "Black Type"	Mechanism Cover
M 70	QBT1691	Lamp Lever Spring-B
M 71	QBT1566	Intermediate Lever Spring
M 72	QXL1414	Lock Lever-A
M 73	QXL1507	Lock Lever-B
M 74	XUC25FT	Stop Ring
M 75	QXR0780	Eject Rod Assembly
M 76	QKJ0499	Dumper Gear Holder
M 77	QDG1254	Dumper Gear
M 78	XNG26	Nut
M 79	XSN26 + 8B	Screw ⊕2.6 × 8
M 80	QMH2085 "Silver Type"	Cassette Holder
	QMH2085K "Black Type"	Cassette Holder
M 81	XWG26	Washer 2.6ϕ
M 82	QMA4072	Auto Tape Selector Angle
M 83	QML3716	Tape Detection Lever (for Normal/CrO_2 Tape)

Ref No.	Part No.	Part Name & Description
M 84	QML3717	Tape Detection Lever (for Metal Tape)
M 85	QNM2642	Detection Lever Shaft
M 86	XTN2 + 6B	Tapping Screw ⊕2 × 6
M 87	XWG3	Washer 3ϕ
M 88	XWG26	Washer 2.6ϕ
M 89	XTN26 + 12B	Tapping Screw ⊕2.6 × 12
M 90	XTN3 + 6B	Tapping Screw ⊕3 × 6
M 91	XTN26 + 5B	Tapping Screw ⊕2.6 × 5

CABINET PARTS

Ref No.	Part No.	Part Name & Description
G 1	QGCM0058 "Silver Type"	Case Cover
	QGCM0058K "Black Type"	Case Cover
G 2	QKA1086	Case Foot
G 3	QGK3201 "Silver Type"	Side Board
	QGK3201K "Black Type"	Side Board
G 4	QBG1736	P.B Cushion
G 5	QGK3223D "Silver Type"	Meter Cover
	QGK3223K "Black Type"	Meter Cover
G 6	QGL1174	Filter
G 7	QYB0411	Button Cover Assembly
G 8	QYP1084 "Silver Type"	Front Panel Assembly
	QYP1085 "Black Type"	Front Panel Assemlbly
G 9	QGK3222B "Silver Type"	Operation Panel
	QGK3222K "Black Type"	Operation Panel
G 10	QKJ0518	Push Button Holder
G 11	QXB0758	Operation Button (Play)
G 12	QXB0759	Operation Button (Pause)
G 13	QXB0760	Operation Button (Record)
G 14	QGO1990 "Silver Type"	Operation Button (Rec-Mute)
	QGO1990Y "Black Type"	Operation Button (Rec Mute)
G 15	QGO1991 "Silver Type"	Operation Button (Fast Forward)
	QGO 1991Y "Black Type"	Operation Button (Fast Forward)
G 16	QGO1993 "Silver Type"	Operation Button (Rewind)
	QG01993Y "Black Type"	Operation Button (Rewind)
G 17	QGO1994 "Silver Type"	Operation Button (Stop)
	QG01994Y "Black Type"	Operation Button (Stop)
G 18	QGO1995	Push Button (Counter Reset)
G 19	QYF0542 "Silver Type"	Cassette Lid Assembly
	QYF0542K "Black Type"	Cassette Lid Assembly
G 20	QYT0636	Volume Knob-R
G 21	QYT0637	Volume Knob-L
G 22	QGT1569	Select Knob
G 23	QGO2043	Function Button
G 24	QGO2042	Timer Buttom
G 25	QGO1900	Power Button
G 26	QMR1986	Power Rod
G 27	QJC0049	Earth Plate-A
G 28	QTS1576	Meter Shield Plate
G 29	QKM1512	Main Case Assembly
G 30	QMK1959	Sub Chassis
G 31	QTW1279	Meter Insulating Plate
G 32	XTB4 + 10BFN	Screw ⊕4 × 10
G 33	QTS1575	Microphone Shield Plate
G 34	QMA4363	Volume Angle
G 35 [N]	QGS2985	Main Name Plate
[For Asia, Latin America, Middle East and Africa areas.]		
[A]	QGS2975	Main Name Plate
[For Australia.]		
G 36	QBH2012	Cover Cushion
G 38	XTN3 + 10B	Tapping Screw ⊕3 × 10
G 39	XTS3 + 12B	Tapping Screw ⊕3 × 12
G 40	XWE3	Washer
G 41	XTN26 + 10B	Tapping Screw
G 42	XTN3 + 12B	Tapping Screw
G 43	QTS1579	Shield Plate
G 44	XSN3 + 8S	Screw ⊕3 × 8
G 45	XWA3B	Washer

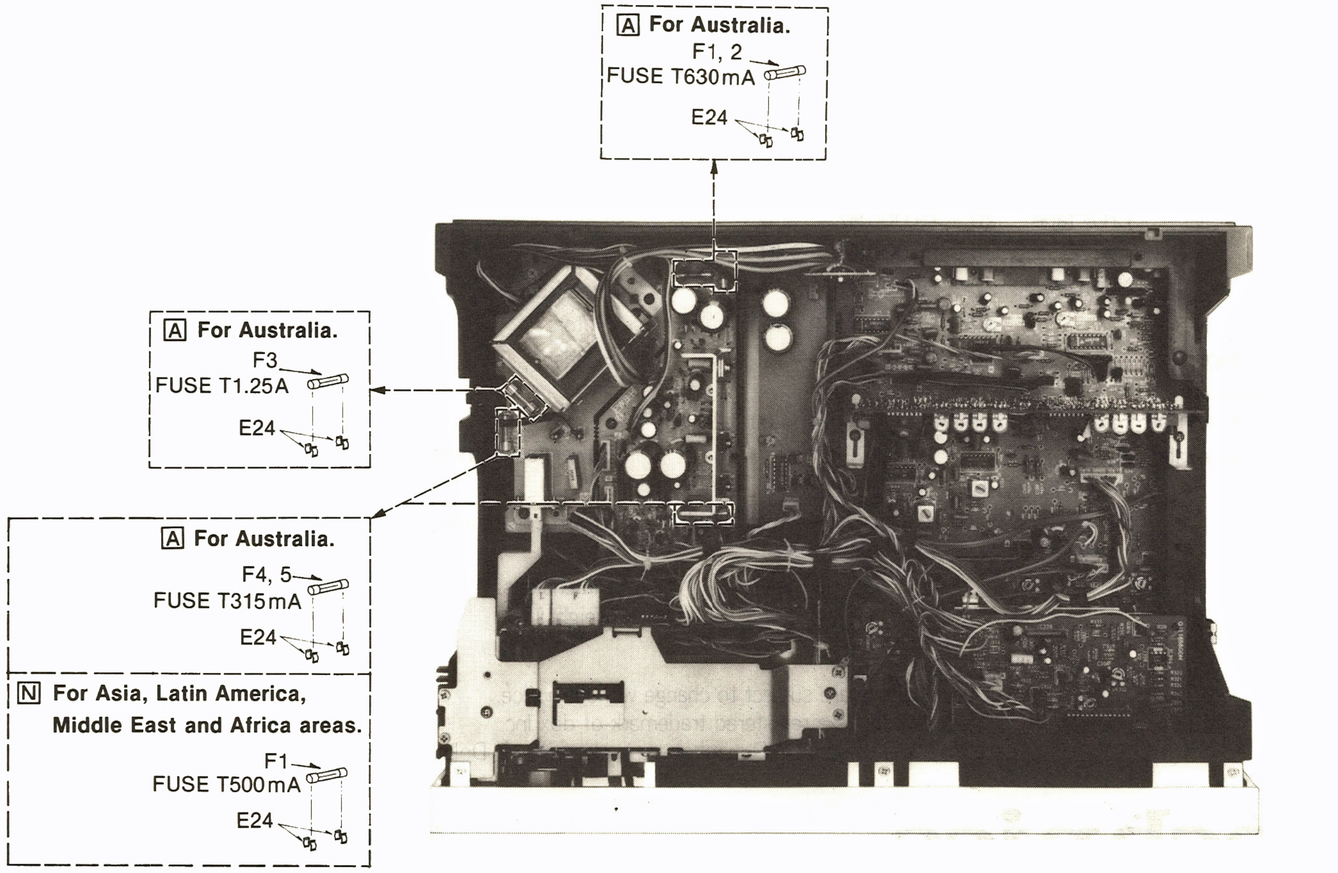
ACCESSORIES

Ref No.	Part No.	Part Name & Description
A 1	RP023A	Connection Cord
A 2 [N]	QQT3266	Instruction Book
[For Asia, Latin America, Middle East and Africa areas.]		
[A]	QQT3268	Instruction Book
[For Australia.]		

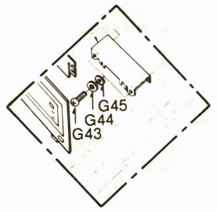
PACKINGS

Ref No.	Part No.	Part Name & Description
P 1	QPN4290	Inside Carton
P 2	QPA0654	Cushion-A
P 3	QPA0655	Cushion-B
P 4	XZB50X65A02	Poly Bag
P 5	QPS0618	Pad
P 6	QPC0072	Sheet
P 7	QPA0662	Spacer

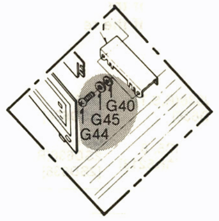
ELECTRICAL PARTS LOCATION



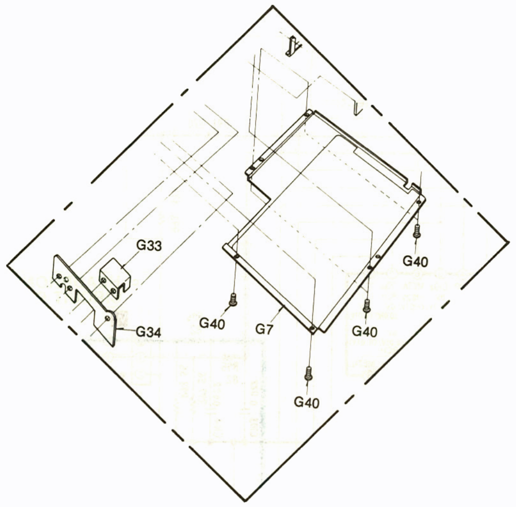
CABINET PARTS LOCATION



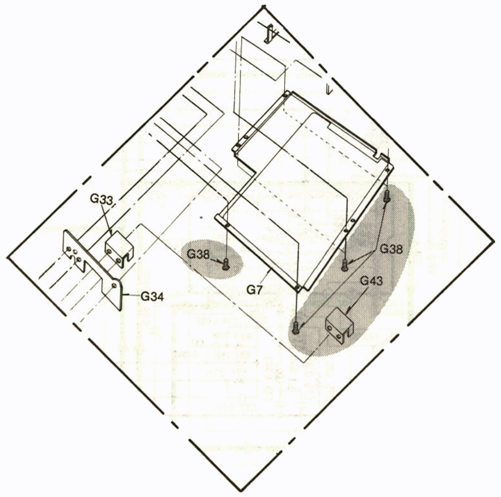
D ...For all European areas.



AN ...For Australia, Asia, Latin America, Middle East and Africa areas.


G33
G40
G34
G40
G7
G40
G40

D ...For all European areas.

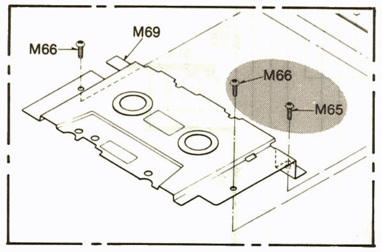

G33
G38
G38
G34
G7
G43

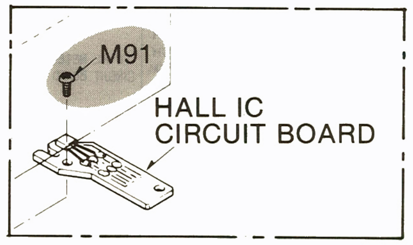
AN ...For Australia, Asia, Latin America, Middle East and Africa areas.

MECHANISM PARTS LOCATION

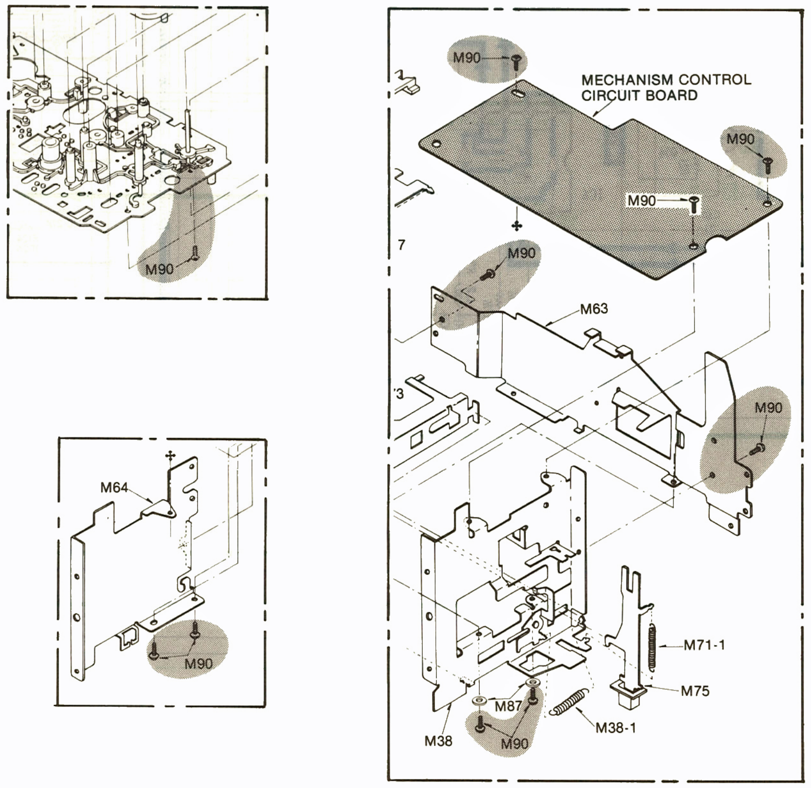
(DIFFERENCE)

Front Side

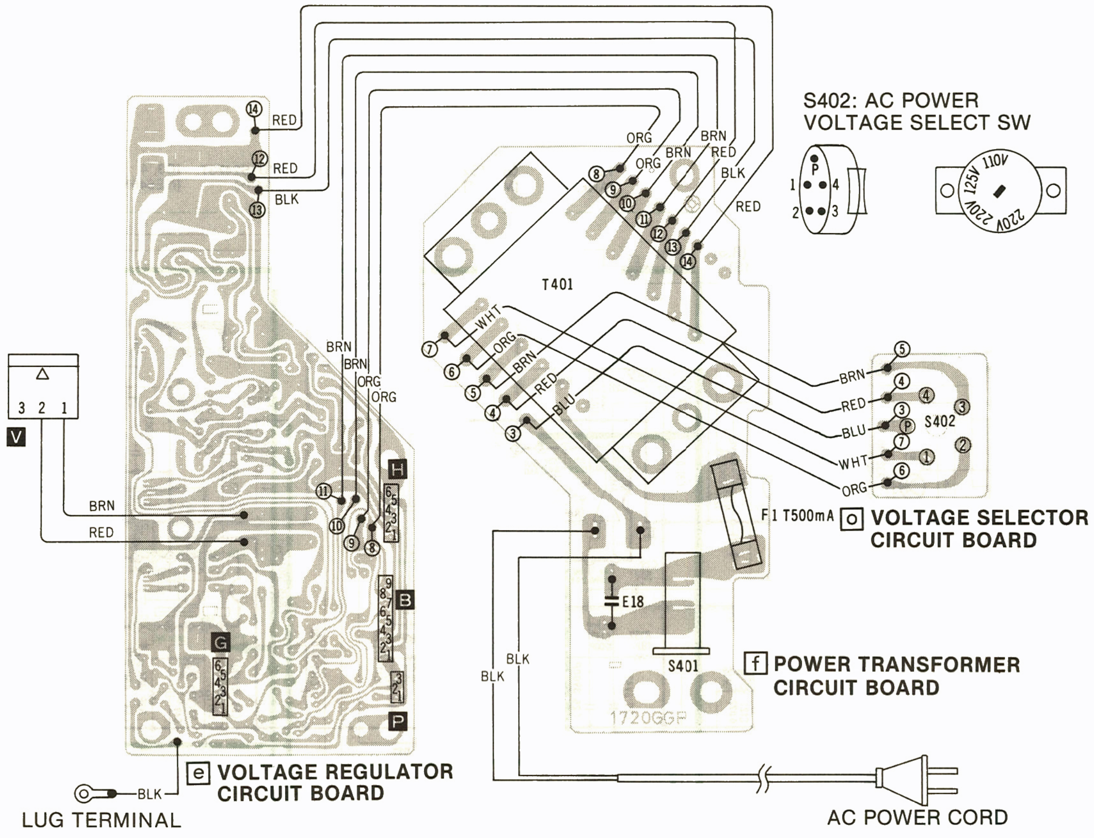

M66
M69
M66
M65


M91
HALL IC
CIRCUIT BOARD

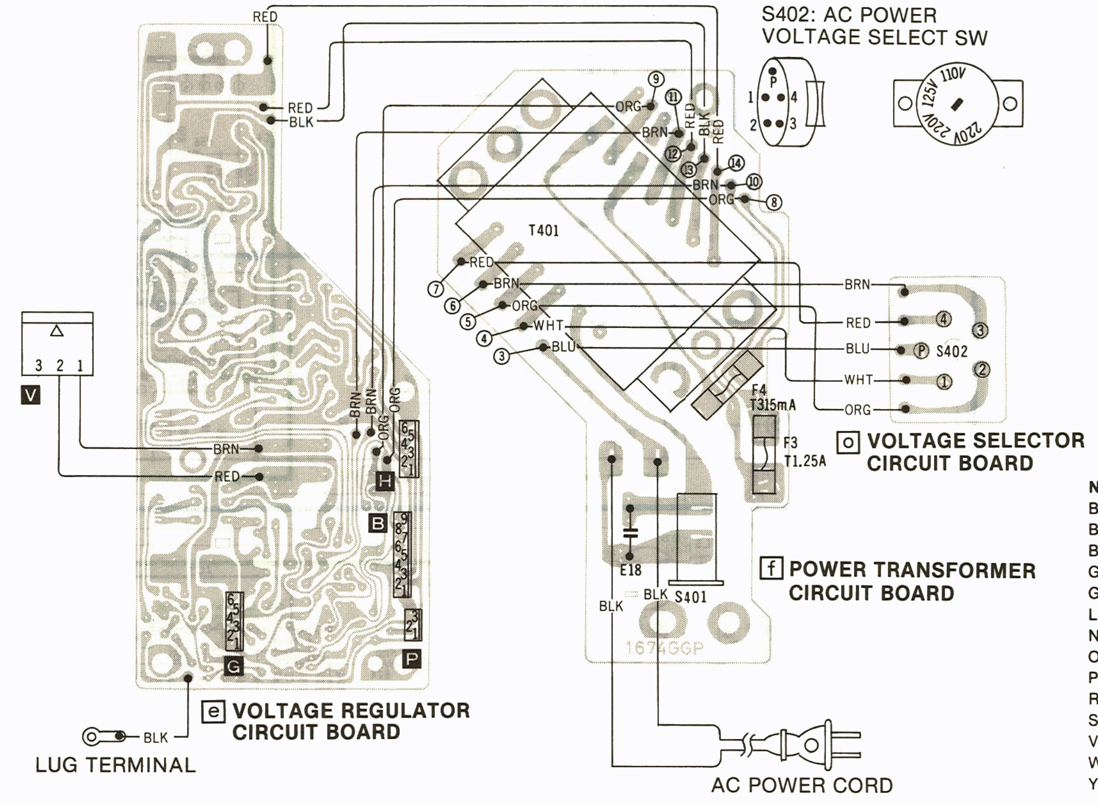
Rear Side


M90
M64
M90
M90
MECHANISM CONTROL CIRCUIT BOARD
M90
M90
M90
M63
M90
M71-1
M75
M87
M38-1
M38
M90

WIRING CONNECTION DIAGRAM


S402: AC POWER VOLTAGE SELECT SW
110V
125V
220V
240V
RED
RED
BLK
ORG
ORG
BRN
BRN
RED
BLK
RED
T401
WHT
ORG
BRN
RED
BLU
BRN
BRN
ORG
ORG
BRN
RED
BLU
WHT
ORG
S402
V
BRN
RED
H
B
G
P
F1 T500mA
o VOLTAGE SELECTOR CIRCUIT BOARD
E18
S401
BLK
BLK
f POWER TRANSFORMER CIRCUIT BOARD
e VOLTAGE REGULATOR CIRCUIT BOARD
BLK
LUG TERMINAL
AC POWER CORD

∗ For Asia, Latin America, Middle East and Africa areas.


RED
S402: AC POWER VOLTAGE SELECT SW
110V
125V
220V
240V
RED
BLK
ORG
BRN
RED
BLK
RED
BRN
ORG
T401
RED
BRN
ORG
WHT
BLU
BRN
RED
BLU
WHT
ORG
S402
F4 T315mA
F3 T1.25A
o VOLTAGE SELECTOR CIRCUIT BOARD
V
BRN
RED
BRN
BRN
ORG
ORG
H
B
G
P
E18
BLK
BLK
S401
f POWER TRANSFORMER CIRCUIT BOARD
e VOLTAGE REGULATOR CIRCUIT BOARD
BLK
LUG TERMINAL
AC POWER CORD

∗ For Australia.

NOTES:

BLK	Black
BLU	Blue
BRN	Brown
GRY	Gray
GRN	Green
L. BLU	Light Blue
NIL	No Color Mark
ORG	Orange
PNK	Pink
RED	Red
SLD	Shield Wire
VLT	Violet
WHT	White
YEL	Yellow

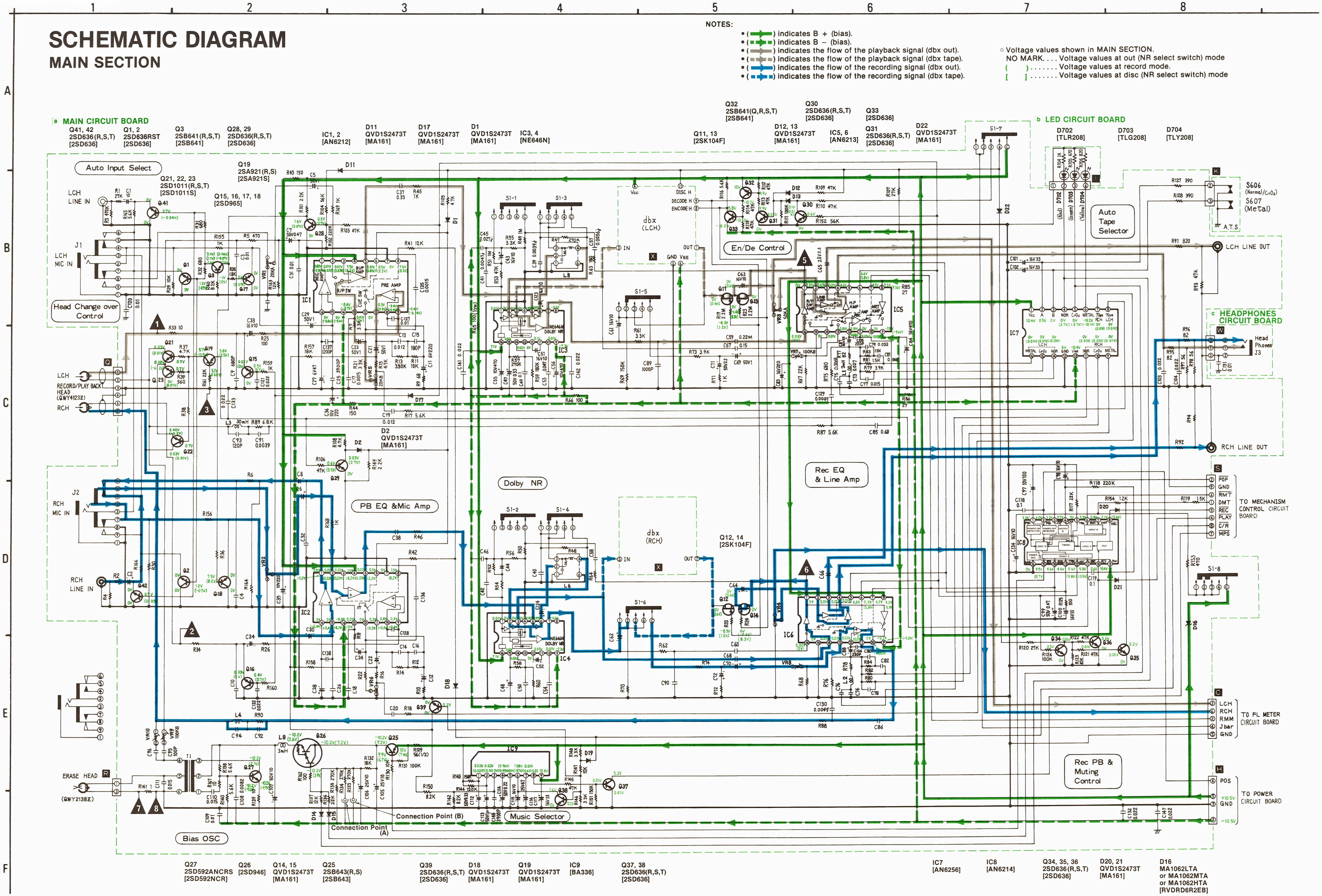
SCHEMATIC DIAGRAM

MAIN SECTION

NOTES:

- (🟩) indicates B + (bias).
- (🟩 dashed) indicates B – (bias).
- (▨) indicates the flow of the playback signal (dbx out).
- (▨ dashed) indicates the flow of the playback signal (dbx tape).
- (🟦) indicates the flow of the recording signal (dbx out).
- (🟦 dashed) indicates the flow of the recording signal (dbx tape).

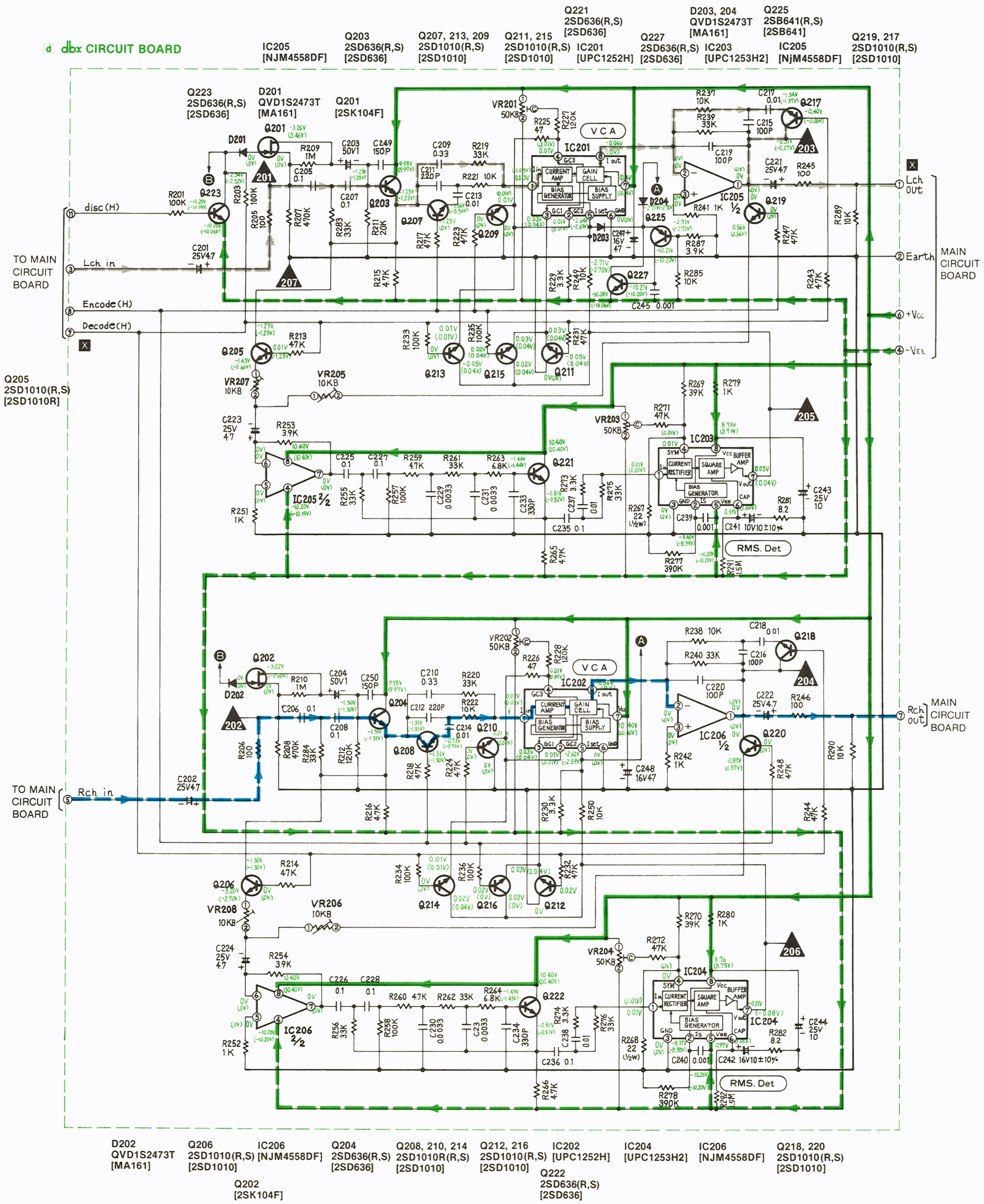
○ Voltage values shown in MAIN SECTION.
NO MARK. . . . Voltage values at out (NR select switch) mode
(   ) . . . . Voltage values at record mode.
[   ] . . . . Voltage values at disc (NR select switch) mode


1
2
3
4
5
6
7
8
A
B
C
D
E
F
a MAIN CIRCUIT BOARD
Q41, 42 2SD636(R,S,T) [2SD636]
Q1, 2 2SD636RST [2SD636]
Q3 2SB641(R,S,T) [2SB641]
Q28, 29 2SD636(R,S,T) [2SD636]
IC1, 2 [AN6212]
D11 QVD1S2473T [MA161]
D17 QVD1S2473T [MA161]
D1 QVD1S2473T [MA161]
IC3, 4 [NE646N]
Q11, 13 [2SK104F]
Q32 2SB641(Q,R,S,T) [2SB641]
D12, 13 QVD1S2473T [MA161]
Q30 2SD636(R,S,T) [2SD636]
IC5, 6 [AN6213]
Q33 [2SD636]
Q31 2SD636(R,S,T) [2SD636]
D22 QVD1S2473T [MA161]
b LED CIRCUIT BOARD
D702 [TLR208]
D703 [TLG208]
D704 [TLY208]
Q19 2SA921(R,S) [2SA921S]
Q21, 22, 23 2SD1011(R,S,T) [2SD1011S]
Q15, 16, 17, 18 [2SD965]
D2 QVD1S2473T [MA161]
Q12, 14 [2SK104F]
Auto Input Select
Head Change over Control
PB EQ &Mic Amp
Dolby NR
dbx (LCH)
dbx (RCH)
En/De Control
Rec EQ & Line Amp
Auto Tape Selector
Rec PB & Muting Control
Music Selector
Bias OSC
Connection Point (B)
Connection Point (A)
LCH LINE IN
LCH MIC IN
RCH MIC IN
RCH LINE IN
LCH RECORD/PLAY BACK HEAD (QWY4123Z) RCH
ERASE HEAD (QWY2138Z)
LCH LINE OUT
RCH LINE OUT
c HEADPHONES CIRCUIT BOARD
Head Phones J3
S606 (Normal/CrO2)
S607 (Metal)
A.T.S
TO MECHANISM CONTROL CIRCUIT BOARD
POF GND RMT DMT REC PLAY C/R MPS
TO FL METER CIRCUIT BOARD
LCH RCH RMM J bar GND
TO POWER CIRCUIT BOARD
POS GND -10.5V
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
S1-1
S1-2
S1-3
S1-4
S1-5
S1-6
S1-7
S1-8
Q27 2SD592ANCRS [2SD592NCR]
Q26 [2SD946]
Q14, 15 QVD1S2473T [MA161]
Q25 2SB643(R,S) [2SB643]
Q39 2SD636(R,S,T) [2SD636]
D18 QVD1S2473T [MA161]
Q19 QVD1S2473T [MA161]
IC9 [BA336]
Q37, 38 2SD636(R,S,T) [2SD636]
IC7 [AN6256]
IC8 [AN6214]
Q34, 35, 36 2SD636(R,S,T) [2SD636]
D20, 21 QVD1S2473T [MA161]
D16 MA1062LTA or MA1062MTA or MA1062HTA [RVDRD6R2EB]

dbx SECTION

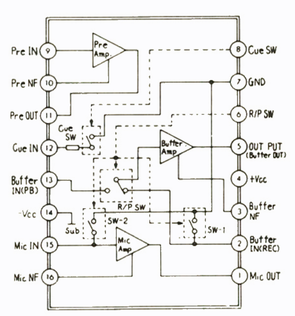
NOTES:

- ○ Voltage values shown in dbx SECTION.
- ( ) .... Voltage values at out (NR select switch) mode.
- [ ] .... Voltage values at disc (NR select switch) mode.
  For measurement use VTVM.

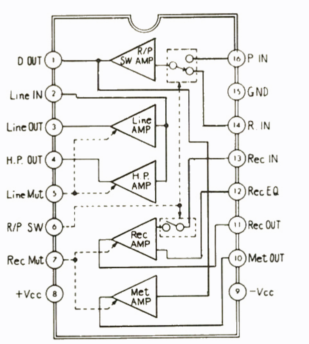

d dbx CIRCUIT BOARD
IC205 [NJM4558DF]
Q203 2SD636(R,S) [2SD636]
Q207, 213, 209 2SD1010(R,S) [2SD1010]
Q211, 215 2SD1010(R,S) [2SD1010]
Q221 2SD636(R,S) [2SD636]
IC201 [UPC1252H]
Q227 2SD636(R,S) [2SD636]
D203, 204 QVD1S2473T [MA161]
IC203 [UPC1253H2]
Q225 2SB641(R,S) [2SB641]
IC205 [NJM4558DF]
Q219, 217 2SD1010(R,S) [2SD1010]
Q223 2SD636(R,S) [2SD636]
D201 QVD1S2473T [MA161]
Q201 [2SK104F]
Q205 2SD1010(R,S) [2SD1010R]
VCA
RMS. Det
TO MAIN CIRCUIT BOARD
disc (H)
Lch in
Encode (H)
Decode (H)
Lch out
Earth
+Vcc
−Vcc
MAIN CIRCUIT BOARD
Rch out
Rch in
D202 QVD1S2473T [MA161]
Q206 2SD1010(R,S) [2SD1010]
IC206 [NJM4558DF]
Q204 2SD636(R,S) [2SD636]
Q208, 210, 214 2SD1010R(R,S) [2SD1010]
Q212, 216 2SD1010(R,S) [2SD1010]
IC202 [UPC1252H]
IC204 [UPC1253H2]
IC206 [NJM4558DF]
Q218, 220 2SD1010(R,S) [2SD1010]
Q202 [2SK104F]
Q222 2SD636(R,S) [2SD636]

EQUIVALENT CIRCUITS

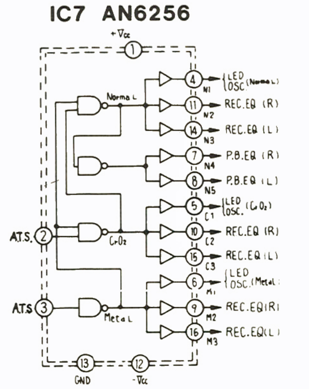
IC1,2 AN6212


Pre IN
Pre NF
Pre OUT
Cue IN
Buffer IN(PB)
−Vcc
Mic IN
Mic NF
Cue SW
GND
R/P SW
OUT PUT (Buffer OUT)
+Vcc
Buffer NF
Buffer IN(REC)
Mic OUT

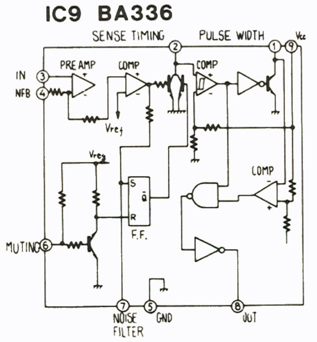
IC5,6 AN6213


D OUT
Line IN
Line OUT
H.P. OUT
Line Mut
R/P SW
Rec Mut
+Vcc
P IN
GND
R IN
Rec IN
Rec EQ
Rec OUT
Met OUT
−Vcc
R/P SW AMP
Line AMP
H.P AMP
Rec AMP
Met AMP

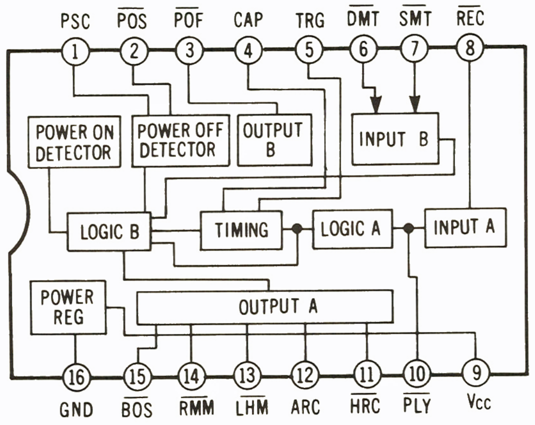
IC7 AN6256


+Vcc
ATS
Normal
Metal
LED OSC (Normal)
REC.EQ (R)
REC.EQ (L)
P.B.EQ (R)
P.B.EQ (L)
LED OSC (CrO₂)
REC.EQ (R)
REC.EQ (L)
LED OSC (Metal)
REC.EQ (R)
REC.EQ (L)
GND
−Vcc

IC9 BA336


SENSE TIMING
PULSE WIDTH
Vcc
PRE AMP
COMP
IN
NFB
Vref
F.F.
MUTING
NOISE FILTER
GND
OUT

IC8 AN6214


PSC
POS
POF
CAP
TRG
DMT
SMT
REC
POWER ON DETECTOR
POWER OFF DETECTOR
OUTPUT B
INPUT B
LOGIC B
TIMING
LOGIC A
INPUT A
POWER REG
OUTPUT A
GND
BOS
RMM
LHM
ARC
HRC
PLY
Vcc

■ Truth table of IC1, 2 (Postive)

R / P SW

⑥pin	Operation
H	REC
L	PB

SW-1, SW-2

⑥pin	Operation
H	———
L	Mute

Cue SW

⑧pin	Operation
H	———
L	Cue

■ Truth table of IC5, 6 (Positive)

R / P SW

⑥pin	Operation
H	REC
L	PB

Muting

⑤,⑦Pin	Operation
H	Muting OFF
L	Muting ON

L : GND Level

SPECIFICATIONS

- ∗ Input level controls ··· MAX
- ∗ Output level control ··· MAX

Playback S/N ratio ∗ Test tape ··· QZZCFM	Greater than 45 dB
Overall distortion ∗ Test tape ··· QZZCRA for Normal ··· QZZCRX for CrO₂ ··· QZZCRZ for Metal	Less than 4 %
Overall S/N ratio ∗ Test tape ··· QZZCRA	Greater than 43 dB (without NAB filter)

NOTES:

- S1-1—S1-8 .... NR select switch (shown in OUT position: (1) Dolby NR, (2) OUT, (3) dbx tape, (4) dbx disc)
- S606 .... Auto tape select switch (For Normal/CrO₂ tape)
- S607 .... Auto tape select switch (For Metal tape)

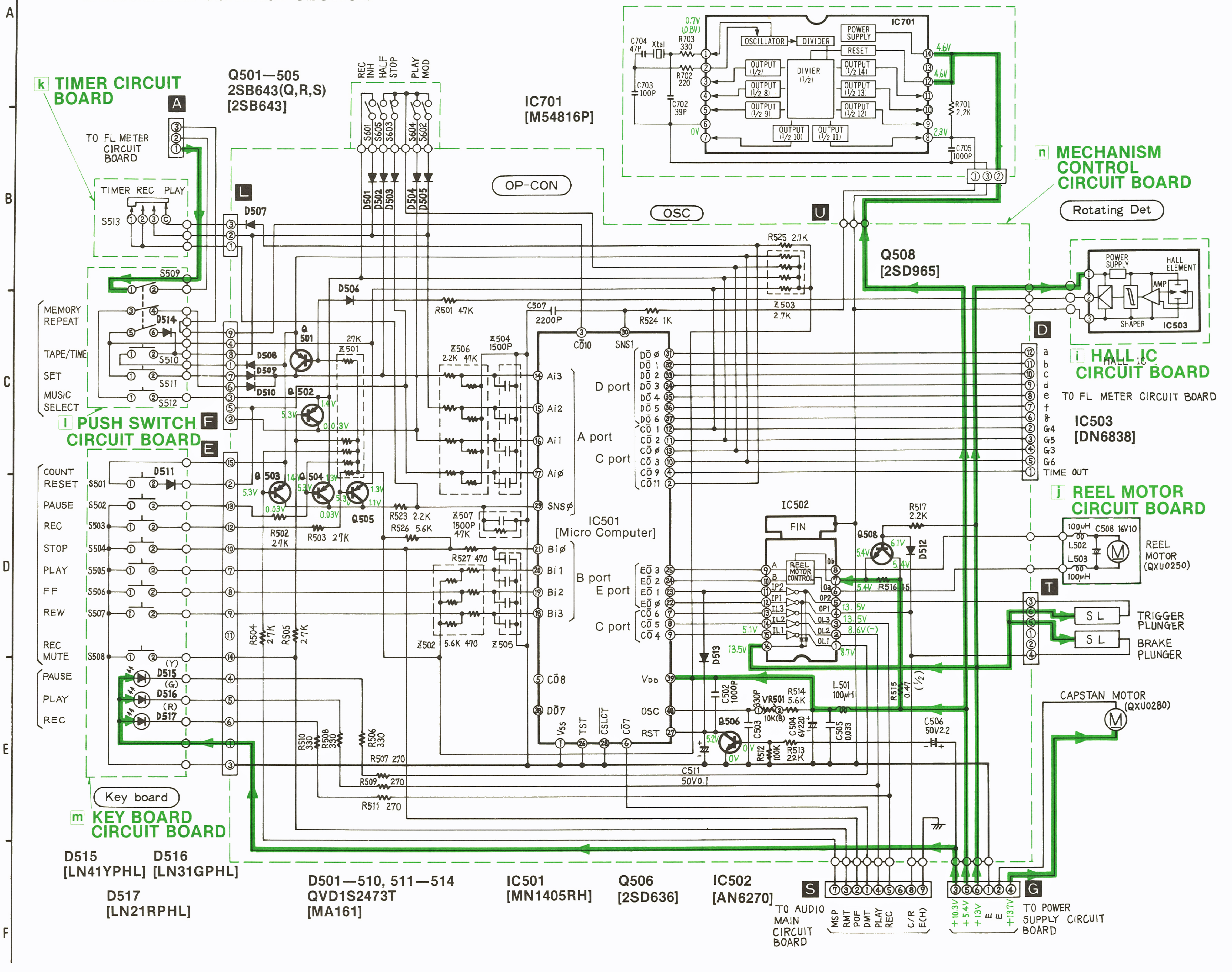
Mode	S606	S607
Normal	on	on
CrO₂	on	off
Metal	off	off

- VR1, 2. .... Input level controls.
- VR3, 4. .... Output level control.
- VR5, 6. .... Playback gain adjustment VR.
- VR7, 8. .... Recording gain adjustment VR.
- VR9, 10. .... Bias current adjustment VR.
- VR201, 202. .... VCA symmetry adjustment VR.
- VR203, 204. .... RMS detector adjustment VR.
- VR205, 206. .... dbx standard level adjustment VR (Encode).
- VR207, 208. .... dbx standard level adjustment VR (Decode).
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k (Ω)
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ▼ = test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

  e.g. Q1
  2SC1844 (E, F) ◄— Production parts number
  [2SC1844E] ◄—— Supply parts number
  D212
  1S2473T77 ◄—— Production parts number.
  [MA161] ◄—— Supply parts numbers
- The supply parts number is described alone in the replacement parts list.
- **This schematic diagram may be modified at any time with the development of new technology.**

SCHEMATIC DIAGRAM

MECHANISM CONTROL SECTION


k TIMER CIRCUIT BOARD
A
TO FL METER CIRCUIT BOARD
TIMER REC PLAY
S513
Q501—505
2SB643(Q,R,S)
[2SB643]
IC701
[M54816P]
REC INH
HALF STOP
PLAY MOD
S601 S606 S603 S604 S602
D501 D502 D503 D504 D505
OP-CON
OSC
L
D507
S509
MEMORY REPEAT
D514
TAPE/TIME
S510
SET
S511
MUSIC SELECT
S512
D508 D509 D510
D506
l PUSH SWITCH CIRCUIT BOARD
F
E
COUNT RESET
PAUSE
REC
STOP
PLAY
FF
REW
REC MUTE
S501 S502 S503 S504 S505 S506 S507 S508
D511
PAUSE (Y) D515
PLAY (G) D516
REC (R) D517
Key board
m KEY BOARD CIRCUIT BOARD
D515 [LN41YPHL]
D516 [LN31GPHL]
D517 [LN21RPHL]
D501—510, 511—514
QVD1S2473T
[MA161]
IC501
[MN1405RH]
Q506
[2SD636]
IC502
[AN6270]
IC501
[Micro Computer]
D port
A port
C port
B port
E port
C port
SNS∅
VDD
OSC
RST
Vss
TST
CSLCT
CŌ7
CŌ8
DŌ7
IC701
OSCILLATOR
DIVIDER
POWER SUPPLY
RESET
DIVIER (1/2)
OUTPUT (1/2)
OUTPUT (1/2 8)
OUTPUT (1/2 9)
OUTPUT (1/2 10)
OUTPUT (1/2 11)
OUTPUT (1/2 12)
OUTPUT (1/2 13)
OUTPUT (1/2 14)
C704 47P
Xtal
R703 330
R702 220
C703 100P
C702 39P
R701 2.2K
C705 1000P
U
n MECHANISM CONTROL CIRCUIT BOARD
Rotating Det
Q508
[2SD965]
R525 2.7K
Z503 2.7K
R501 47K
C507 2200P
R524 1K
Z506 2.2K 47K
Z504 1500P
Z501 27K
R523 2.2K
R526 5.6K
Z507 1500P 47K
R527 470
R502 2.7K
R503 27K
R504 27K
R505 27K
Z502 5.6K 470
Z505
R510 330
R508 330
R506 330
R507 270
R509 270
R511 270
POWER SUPPLY
HALL ELEMENT
AMP
SHAPER
IC503
D
i HALL IC CIRCUIT BOARD
TO FL METER CIRCUIT BOARD
IC503
[DN6838]
G4 G5 G3 G6
TIME OUT
IC502
FIN
REEL MOTOR CONTROL
R517 2.2K
Q508
D512
R516
j REEL MOTOR CIRCUIT BOARD
100μH C508 16V10
L502
L503
REEL MOTOR (QXU0250)
T
SL TRIGGER PLUNGER
SL BRAKE PLUNGER
D513
C502 1000P
R514 5.6K
VR501 10K(B)
L501 100μH
R515 0.47 (½)
C503 330P
Q506
R512 100K
C504 6V220
R513 22K
C505 0.033
C506 50V22
C511 50V0.1
CAPSTAN MOTOR (QXU0280)
S
TO AUDIO MAIN CIRCUIT BOARD
MSP RMT POF DMT PLAY REC C/R E(H)
G
+10.3V +5.4V +13V E E +13.7V
TO POWER SUPPLY CIRCUIT BOARD

NOTES:

- VR501. . . . Input scanning time adjustment VR
- S501 . . . . . Counter reset switch
- S502 . . . . . Pause switch
- S503 . . . . . Record switch
- S504 . . . . . Stop switch
- S505 . . . . . Playback switch
- S506 . . . . . Fast Forward switch
- S507 . . . . . Rewind switch
- S508 . . . . . Record mute switch
- S509 . . . . . Memory repeat switch
- S510 . . . . . Tape/Time select switch
- S511 . . . . . Set switch
- S512 . . . . . Music select switch
- S513 . . . . . Timer switch (shown in REC position: (1) REC, (2) OFF, (3) PLAY)
- S601 . . . . . Accidental erase prevention switch
- S602 . . . . . Mode switch
- S603 . . . . . Stop switch
- S604 . . . . . Playback switch
- S605 . . . . . Cassette detection switch

} Mode sensing switches

- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
  However, the voltae in record mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM.
- (➡) indicates B + (bias)
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors are diodes. One type of number is used for supply parts number and production parts number when they are identical.

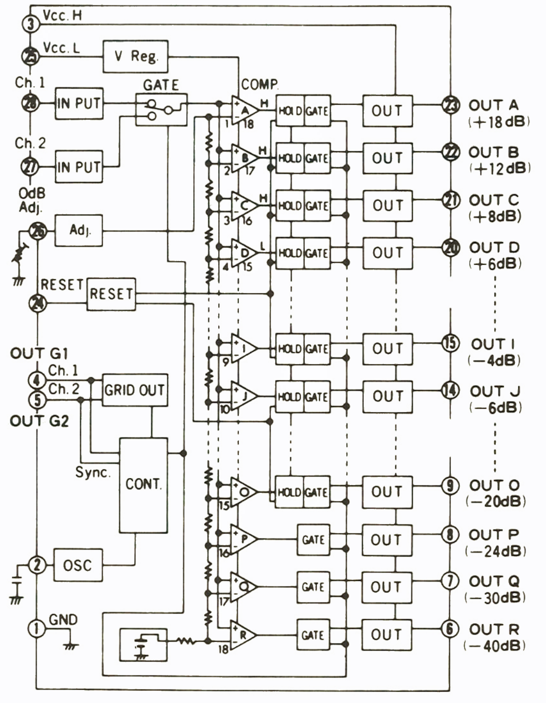
e.g. Q1
2SC1844(E,F) ◀— Production parts number
[2SC1844E] ◀— Supply parts number
D301
QVD1S2473T ◀— Production parts number
[MA161] ◀— Supply parts

- The supply parts number is described alone in the replacement parts list.

- **This schematic diagram may be modified at any time with the development of new technology.**

EQUIVALENT CIRCUITS

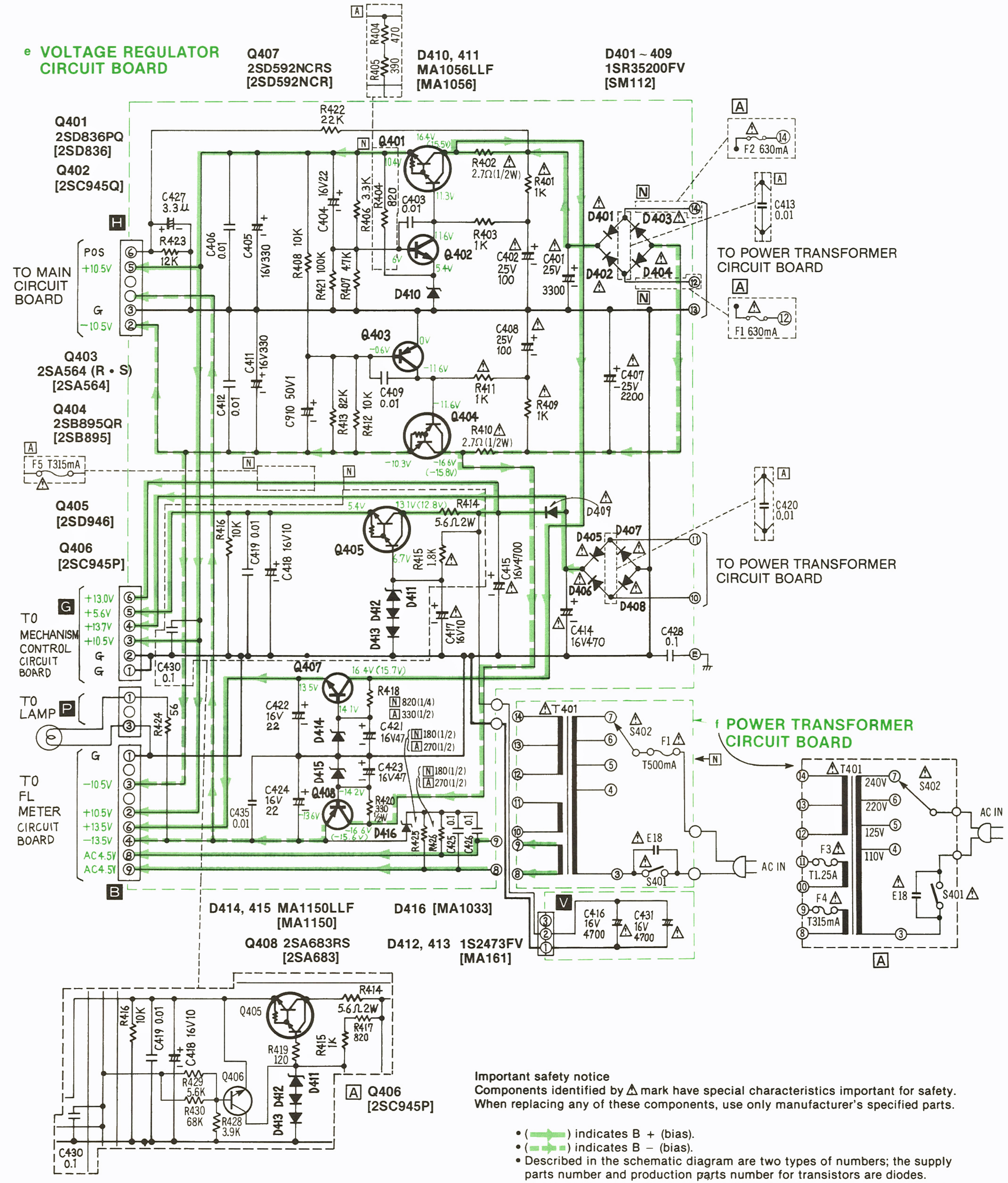
IC301 AN6870


Vcc H
Vcc L
V Reg.
Ch. 1
IN PUT
GATE
COMP
Ch. 2
IN PUT
OdB Adj.
Adj.
RESET
RESET
OUT G1
Ch. 1
Ch. 2
OUT G2
GRID OUT
Sync.
CONT.
OSC
GND
HOLD GATE
GATE
OUT
OUT A (+18dB)
OUT B (+12dB)
OUT C (+8dB)
OUT D (+6dB)
OUT I (−4dB)
OUT J (−6dB)
OUT O (−20dB)
OUT P (−24dB)
OUT Q (−30dB)
OUT R (−40dB)

SCHEMATIC DIAGRAM

POWER SUPPLY SECTION

NOTES:
N ...For Asia, Latin America, Middle East and Africa areas.
A ...For Australia.


A B C D E F
e VOLTAGE REGULATOR CIRCUIT BOARD
Q401 2SD836PQ [2SD836]
Q402 [2SC945Q]
Q403 2SA564 (R • S) [2SA564]
Q404 2SB895QR [2SB895]
Q405 [2SD946]
Q406 [2SC945P]
Q407 2SD592NCRS [2SD592NCR]
D410, 411 MA1056LLF [MA1056]
D401 ~ 409 1SR35200FV [SM112]
R404 470
R405 390
R422 22K
C427 3.3μ
R423 12K
R402 2.7Ω (1/2W)
R401 1K
R403 1K
C402 25V 100
C401 25V 3300
C408 25V 100
C407 25V 2200
R411 1K
R409 1K
R410 2.7Ω (1/2W)
C409 0.01
C403 0.01
F2 630mA
F1 630mA
C413 0.01
C420 0.01
TO POWER TRANSFORMER CIRCUIT BOARD
TO MAIN CIRCUIT BOARD
POS +10.5V G −10.5V
F5 T315mA
R414 5.6Ω 2W
R416 10K
C419 0.01
C418 16V10
R415 1K
C415 16V4700
C414 16V470
C428 0.1
TO MECHANISM CONTROL CIRCUIT BOARD
+13.0V +5.6V +13.7V +10.5V
C430 0.1
TO LAMP
R424 56
R418 N 820(1/4) A 330(1/2)
C422 16V 22
C421 16V47
C423 16V47
C424 16V 22
C435 0.01
R420 N 330 A 1/4W
TO FL METER CIRCUIT BOARD
−10.5V +10.5V +13.5V −13.5V AC4.5V AC4.5V
T401
S402
F1 T500mA
E18
S401
AC IN
POWER TRANSFORMER CIRCUIT BOARD
240V 220V 125V 110V
F3 T1.25A
F4 T315mA
C416 16V 4700
C431 16V 4700
D414, 415 MA1150LLF [MA1150]
Q408 2SA683RS [2SA683]
D416 [MA1033]
D412, 413 1S2473FV [MA161]
R419 120
R417 820
R429 5.6K
R430 68K
R428 3.9K
A Q406 [2SC945P]

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

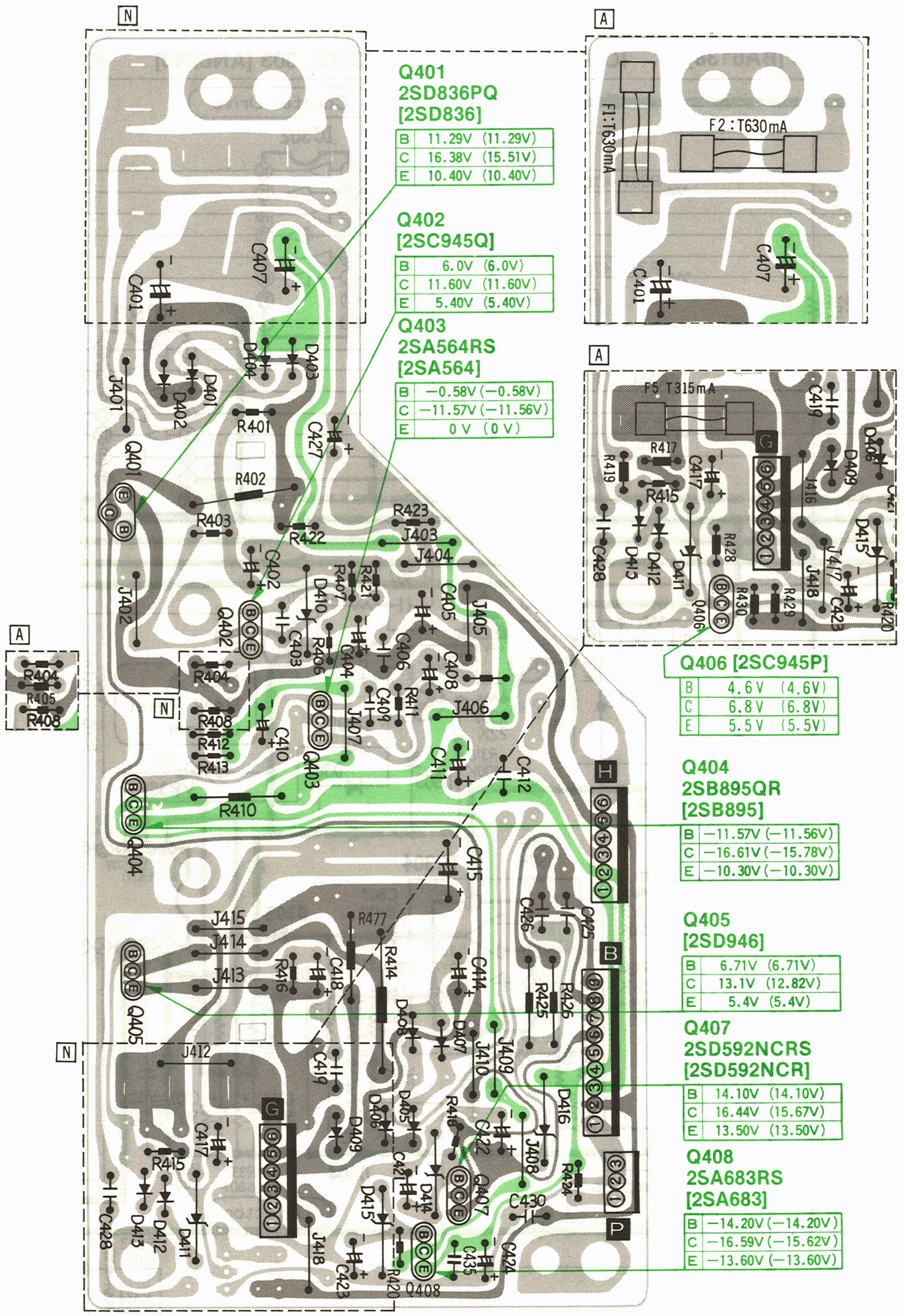
NOTES:
- S401. . . . Power ON/OFF switch.
- S402 . . . .AC power voltage select switch.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
  However, the voltage in record mode is indicated in ( ) when it differs from that in record mode.
  For measurement use VTVM.

- (🟩) indicates B + (bias).
- (🟩) indicates B − (bias).
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors are diodes.
  One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q1
  2SC1844(E,F)◄Production parts number
  [2SC1844E]◄—Supply parts number
  D301
  QVD1S2473T◄Production parts number
  [MA161]◄———Supply parts
- The supply parts number is described alone in the replacement parts list.
- **This schematic diagram may be modified at any time with the development of new technology.**

CIRCUIT BOARD

VOLTAGE REGULATOR CIRCUIT BOARD

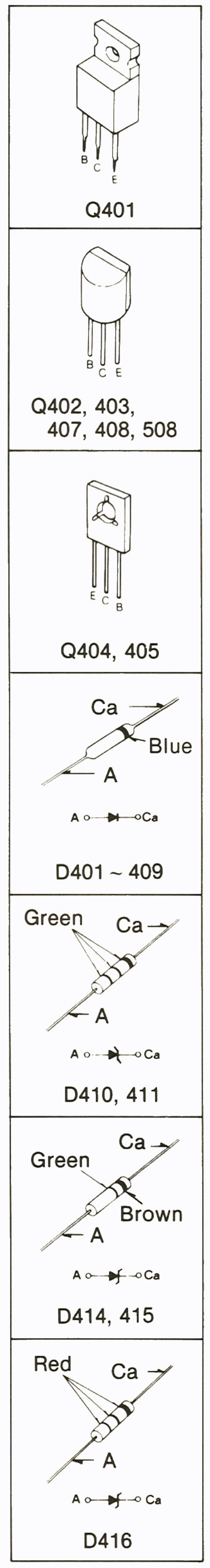
NOTES:
N ...For Asia, Latin America, Middle East and Africa areas.
A ...For Australia.


N
A
F1:T630mA
F2:T630mA
F5 T315mA
Q401 2SD836PQ [2SD836]
B 11.29V (11.29V)
C 16.38V (15.51V)
E 10.40V (10.40V)
Q402 [2SC945Q]
B 6.0V (6.0V)
C 11.60V (11.60V)
E 5.40V (5.40V)
Q403 2SA564RS [2SA564]
B −0.58V (−0.58V)
C −11.57V (−11.56V)
E 0 V (0 V)
Q406 [2SC945P]
B 4.6V (4.6V)
C 6.8V (6.8V)
E 5.5V (5.5V)
Q404 2SB895QR [2SB895]
B −11.57V (−11.56V)
C −16.61V (−15.78V)
E −10.30V (−10.30V)
Q405 [2SD946]
B 6.71V (6.71V)
C 13.1V (12.82V)
E 5.4V (5.4V)
Q407 2SD592NCRS [2SD592NCR]
B 14.10V (14.10V)
C 16.44V (15.67V)
E 13.50V (13.50V)
Q408 2SA683RS [2SA683]
B −14.20V (−14.20V)
C −16.59V (−15.62V)
E −13.60V (−13.60V)
H G B P

NOTES:
- The circuit shown in ■ on the conductor is B + (bias) circuit.
- The circuit shown in 🟩 on the conductor is B− (bias)circuit.
- The circuit shown in ▨ on the conductor side indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ☐ are DC voltage between the ground and electrical parts.
- The voltage indicates are measured during playback mode.
  However, the voltage in record mode is indicates in ( ) when it differs from that in record mode.

- **This circuit board diagram may be modified at any time with the development of new technology.**

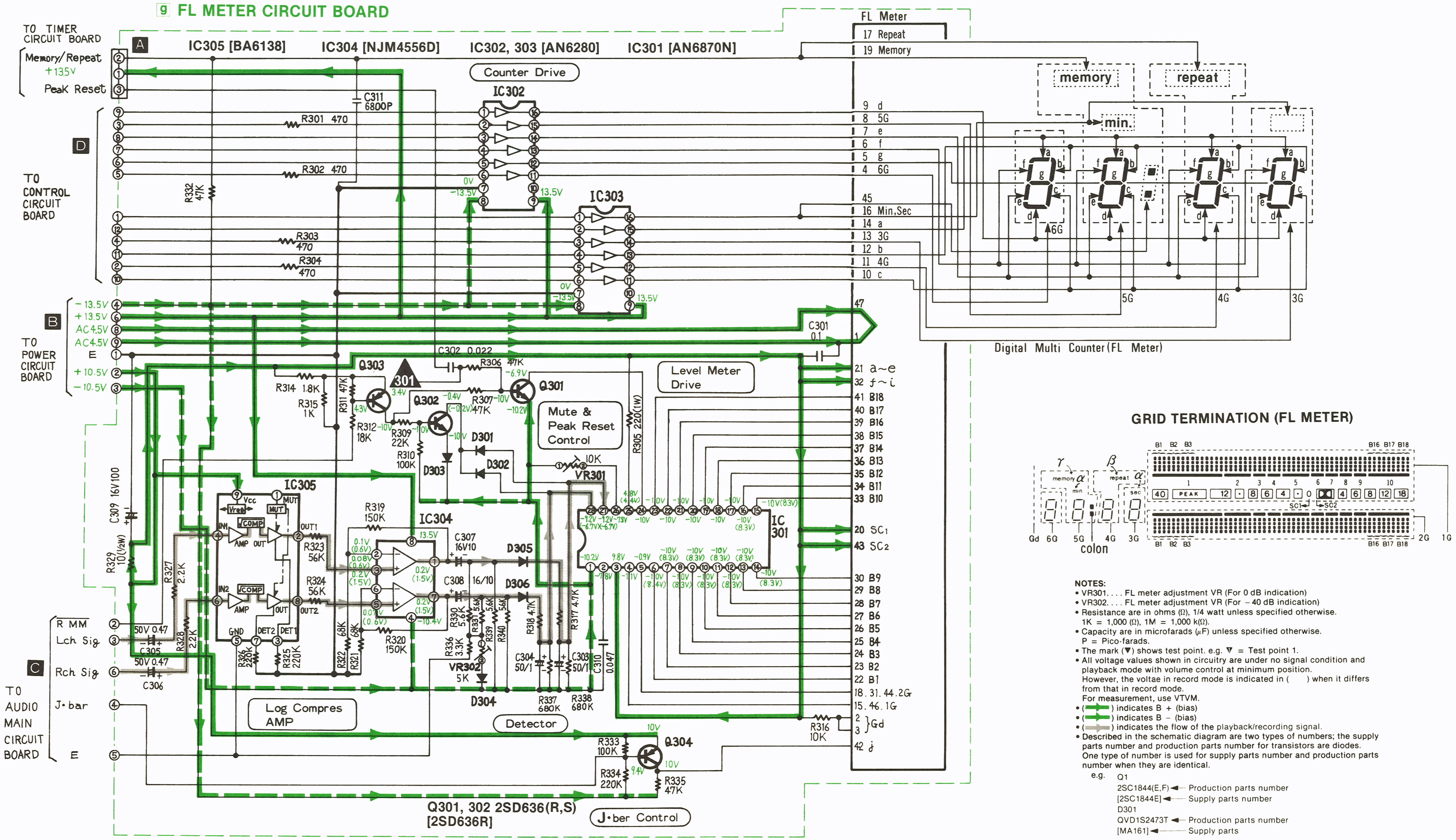
TERMINATIONS


B C E
Q401
Q402, 403, 407, 408, 508
Q404, 405
Ca Blue A
D401 ~ 409
Green Ca A
D410, 411
Green Ca Brown A
D414, 415
Red Ca A
D416

ARD
Y.F
N NK A
Printed in Japan

8 7 6 5 4 3 2 1

FL METER SECTION


g FL METER CIRCUIT BOARD
TO TIMER CIRCUIT BOARD
A
Memory/Repeat
+13.5V
Peak Reset
IC305 [BA6138]
IC304 [NJM4556D]
IC302, 303 [AN6280]
IC301 [AN6870N]
Counter Drive
IC302
IC303
C311 6800P
R301 470
R302 470
R303 470
R304 470
R332 47K
D
TO CONTROL CIRCUIT BOARD
B
TO POWER CIRCUIT BOARD
−13.5V
+13.5V
AC4.5V
AC4.5V
E
+10.5V
−10.5V
C302 0.022
R306 47K
Q303
Q302
Q301
301
R314 1.8K
R315 1K
R311 47K
R312 18K
R309 22K
R310 100K
R307 47K
D301
D302
D303
10K
VR301
R305 220(1W)
Level Meter Drive
Mute & Peak Reset Control
IC305
IC304
IC301
Vcc
Vref
MUT
COMP
AMP
OUT
OUT1
OUT2
IN1
IN2
GND
DET2
DET1
R319 150K
R323 56K
R324 56K
C307 16V10
C308 16/10
D305
D306
R320 150K
R330 5.6K
R336 3.3K
R339
R340
VR302 5K
D304
C304 50/1
C303 50/1
C310 0.047
R318 4.7K
R317 4.7K
R337 680K
R338 680K
R322
R321
R325 220K
R326 220K
R327 2.2K
R328 2.2K
R329 10(1/2W)
C309 16V100
50V 0.47
C305
C306
Log Compres AMP
Detector
C
TO AUDIO MAIN CIRCUIT BOARD
R MM
Lch Sig
Rch Sig
J-bar
E
R333 100K
R334 220K
R335 47K
Q304
R316 10K
C301 0.1
J-ber Control
FL Meter
17 Repeat
19 Memory
9 d
8 5G
7 e
6 f
5 g
4 6G
45
16 Min.Sec
14 a
13 3G
12 b
11 4G
10 c
47
21 a~e
32 f~i
41 B18
40 B17
39 B16
38 B15
37 B14
36 B13
35 B12
34 B11
33 B10
20 SC1
43 SC2
30 B9
29 B8
28 B7
27 B6
26 B5
25 B4
24 B3
23 B2
22 B1
18. 31. 44. 2G
15. 46. 1G
2 3 Gd
42 j
memory
repeat
min.
6G
5G
4G
3G
Digital Multi Counter (FL Meter)
GRID TERMINATION (FL METER)
B1 B2 B3
B16 B17 B18
memory
repeat
min
sec
PEAK
40 12 8 6 4 0 4 6 8 12 18
SC1
SC2
Gd
6G
5G
4G
3G
2G
1G
colon
A
B
C
D
E
F

Q301, 302 2SD636(R,S)
[2SD636R]

D301—303 QVD1S2473T
305, 306 [MA161]

D304 1S2473FV
[MA161]

Q303 2SB641(R,S)
[2SB641R]

Q304 2SA564(R,S,T)
[2SA564R]

NOTES:
- VR301. . . . FL meter adjustment VR (For 0 dB indication)
- VR302. . . . FL meter adjustment VR (For −40 dB indication)
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
  However, the voltae in record mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM.
- (➡) indicates B + (bias)
- (➡) indicates B − (bias)
- (➡) indicates the flow of the playback/recording signal.
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors are diodes.
  One type of number is used for supply parts number and production parts number when they are identical.

  e.g. Q1
  2SC1844(E,F) ◄— Production parts number
  [2SC1844E] ◄— Supply parts number
  D301
  QVD1S2473T ◄— Production parts number
  [MA161] ◄— Supply parts
- The supply parts number is described alone in the replacement parts list.

- **This schematic diagram may be modified at any time with the development of new technology.**

ORDER NO. ARD82010116C2-29

Service Manual

Cassette Deck

RS-M255X

(Silver Face
Black Face)

dbx Equipped Cassette Deck with
Electronic Multi-Mode Counter

DOLBY SYSTEM

This is the Service Manual for the following areas.
D ……… For all European areas except United Kingdom.
B ……… For United Kingdom.

RS-M250 MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback
Tape speed:	4.8 cm/s
Wow and flutter:	0.038 % (WRMS), ±0.13 % (DIN)
Frequency response:	Metal tape; 20 – 20,000 Hz 25 – 18,000 Hz (DIN) 30 – 17,000 Hz ±3 dB CrO_2 tape; 20 – 19,000 Hz 25 – 18,000 Hz (DIN) 30 – 16,000 Hz ±3 dB Normal tape; 20 – 18,000 Hz 25 – 16,000 Hz (DIN) 30 – 15,000 Hz ±3 dB
Dynamic range:	110 dB (at 1 kHz) with dbx in
Max. input level improvement:	10 dB or more improved with dbx in (at 1 kHz)
Signal-to-noise ratio:	dbx* in; 92 dB Dolby** NR in; 68 dB (above 5 kHz) Dolby NR out; 58 dB (signal level = max. input level A weighted, CrO_2 type tape)
Fast forward and rewind time:	Approx. 90 seconds with C-60 cassette tape
Inputs:	MIC; sensitivity 0.25 mV, applicable microphone impedance 400 Ω – 10 kΩ LINE; sensitivity 60 mV, input impedance 47 kΩ
Outputs:	LINE; output level 700 mV, load impedance 22 kΩ over HEADPHONES; output level 125 mV (at 8 Ω)
Bias frequency:	85 kHz
Motor:	2-motor system
Heads:	2-head system 1-SX (Sendust Extra) head for record/playback 1-double-gap ferrite head for erasure
Power requirement:	AC; 110/125/220/240 V, 50-60 Hz Pre-set power voltage 220 V 240 V for United Kingdom
Power consumption:	28 W
Dimensions:	43.0 cm (W) × 10.8 cm (H) × 33.1 cm (D)
Weight:	6.0 kg

Specifications are subject to change without notice.

* The term dbx is a registered trademark of dbx Inc.

** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

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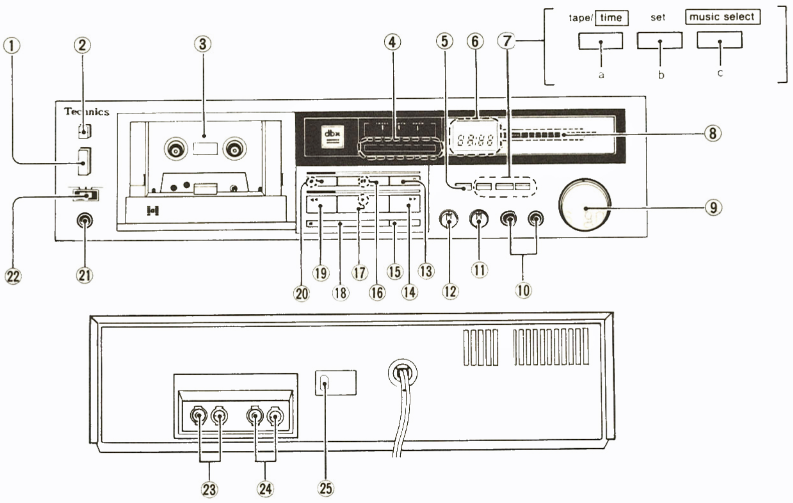
LOCATION OF CONTROLS AND COMPONENTS



① Power switch [power (push on)]
② Eject button [eject]
③ Cassette holder
④ Tape indicator
[Auto Tape Select (Normal • CrO$_2$ • Metal)]
⑤ Memory repeat button [memory repeat (▀ off • ▁ on)]
⑥ Digital multi counter [multi counter]
⑦ Counter mode select button [multi counter mode]
ⓐ Tape/time select button [tape/ time]
ⓑ Set button [set]
ⓒ Music select button [music select]
⑧ FL (fluorescent level) meter
⑨ Input level controls [input level (L ⊖ R)]
⑩ Microphone jacks [mic (L • R)]
⑪ Output level control [output level]
⑫ Noise reduction select switch
[Noise Reduction (Dolby NR • out • dbx tape • dbx disc)]
⑬ Record muting button (rec mute (○)]
⑭ Fast forward button [ff (M • S) (▶▶)]
⑮ Counter reset button [counter reset]
⑯ Pause button and indicator [pause (▮▮)]
⑰ Play button and indicator [play (▶)]
⑱ Stop button [stop (■)]
⑲ Rewind button [rew (M • S) (◀◀)]
⑳ Record button and indicator [rec (○)]
㉑ Headphones jack [phones]
㉒ Timer start switch [⏲ timer (rec • off • play)]
㉓ Line output jacks [LINE OUT (R • L)]
㉔ Line input jacks [LINE IN (R • L)]
㉕ Voltage selector [VOLTAGE SELECTOR]

OPERATING INSTRUCTION

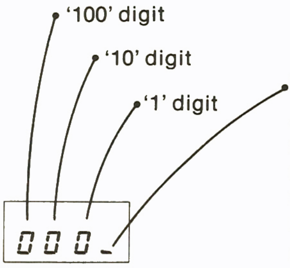
Digital multi counter

The Digital multi counter can be used in combination with the memory repeat, music select, record muting and pause functions.

(1) Using it as a tape counter

The 3-digit digital counter featured in this unit displays a count which is virtually identical to that of Technics' mechanical counter. With a C-60 tape, the count reaches about 400, with a C-90 tape about 600 and with a C-120 tape about 800. The tape counter is employed to read out the tape position by means of the counter figures and so program search can be performed easily.

Tape counter readout



A short rod which rotates in the same direction as the revolving reels is used to indicate that the tape is running. When the rod has gone through one rotation, the count is increased by 1.

Setting to "000"

- When the Power switch is pushed and the power switched on, the counter is reset to "000".
- When other displays appear on the Digital multi counter, set to "000" in the sequence given in the table below.

Present display	"000" setting procedure
Tape counter 123	Depress the Counter reset button
Remaining time counter min sec 00:00 / min sec 12:34	1. Depress the Tape/time select button. 2. Depress the Counter reset button.
Skipping programs oo / o3	1. Depress the Music select button. 2. When the time display appears, depress the Tape/time select button and switch over to the tape counter display. 3. Depress the Counter reset button

(2) Displaying the remaining tape time

The remaining time on the tape is displayed by setting the time at the beginning of the tape in accordance with the length of the tape, and while the tape is running in the recording mode, the time is counted down.

A 30-minute recording can be made on one side with a C-60 tape. When the remaining time counter is set to "30:00" at the beginning of the tape and recording commenced, the counter will show how many minutes of recording are left on the side of the tape being recorded.

Operate as follows:

1. Prepare to operate
   - Depress the Stop button and stop the tape at its beginning.
   - Set the Memory repeat button to the "off" position.
2. When the counter is functioning as a tape counter or is displaying a different indication, change over to the remaining time counter display in the sequence given in the table below.

Present display	Procedure for selection
Tape counter 000 / 123	Depress the Tape/time select button.
Skipping programs oo / o3	1. Depress the Music select button. 2. When the tape counter display appears, depress the Tape/time select button.

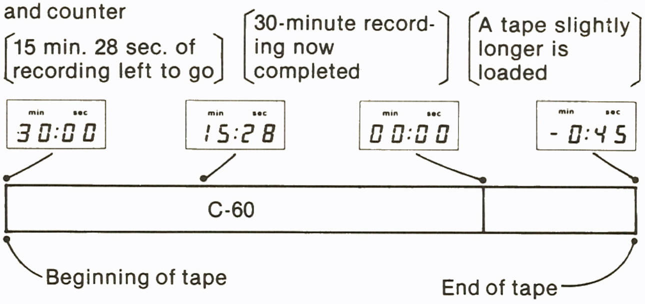
3. Set the time in accordance with the tape length. Every time the Set button is depressed, the counter goes through the following indications: "15:00", "23:00", "30:00", "45:00" and "60:00". Set the time in accordance with the tape length, referring to the table below.

Tape length	Set time	One-side recording time (min.)
C — 30	15:00	15
C — 46	23:00	23
C — 60	30:00	30
C — 90	45:00	45
C — 120	60:00	60

* Some tapes with a non-standard length are sold. When using one of these, set the time to the closest value in the above table.

4. Start the recording

The tape runs and as the amount of tape remaining decreases, the time indicated on the counter also decreases. The figure below shows the relationship between the tape and counter


15 min. 28 sec. of recording left to go
30-minute recording now completed
A tape slightly longer is loaded
min sec 30:00
min sec 15:28
min sec 00:00
min sec -0:45
C-60
Beginning of tape
End of tape

Notes:

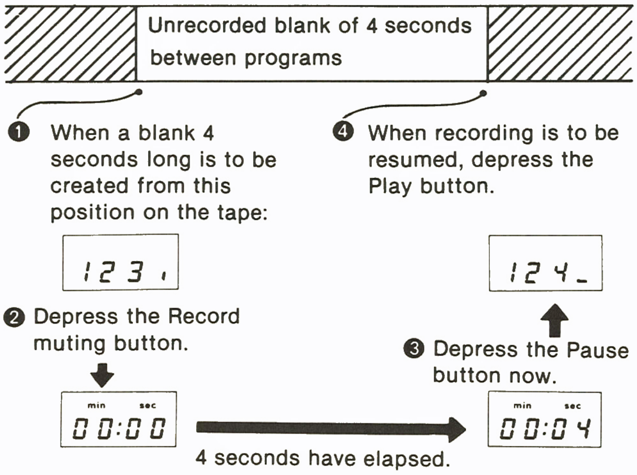
- Do not depress the Fast forward or Rewind button while the remaining tape time is being displayed. This action will cause the counter to function as a tape counter and make it unable to display the correct remaining tape time.
- If the Tape/time select button is depressed when changing over to the remaining time counter, "12:34" or "-0 : 02" will be displayed. This is not the remaining tape time display.
  To find out the precise remaining tape time, it is necessary for the time to be set at the beginning of the tape.

(3) Displaying the record muting time

When the Record muting button is depressed during recording, the Digital multi counter starts counting each passing second and no sound is recorded on the tape.

The function can be used to created unrecorded blanks on the tape of the required length. Blanks of about 4 seconds are required for the music selector to work accurately.

- Given below is the procedure for creating unrecorded blanks of 4 seconds.



❶ When a blank 4 seconds long is to be created from this position on the tape:

❷ Depress the Record muting button.

❸ Depress the Pause button now.

❹ When recording is to be resumed, depress the Play button.

4 seconds have elapsed.

(4) Skipping programs

It is possible to skip up to 20 programs.
Operate as follows:

1. Prepare to operate.
   - Set the Memory repeat button to the "off" position.
   - Depress the Music select button and make the Digital multi counter indicate "oo".
2. Set the number of programs to be skipped.
   - Every time the Set button is depressed, the number increases by 1. Set to the desired number.
   - To reset the number of programs to be skipped (for instance, "o3" has been set although "o2" was initially desired), depress the Music select button twice to make the counter display "oo", and then depress the Set button to set the desired number.
3. Depress the Fast forward or Rewind button.
   - Playback starts automatically as soon as the tape reaches the start of the required program.
   - The digital multi counter display decreases by 1 every time a gap between programs is detected, and when playback begins, it changes over to the tape counter function.

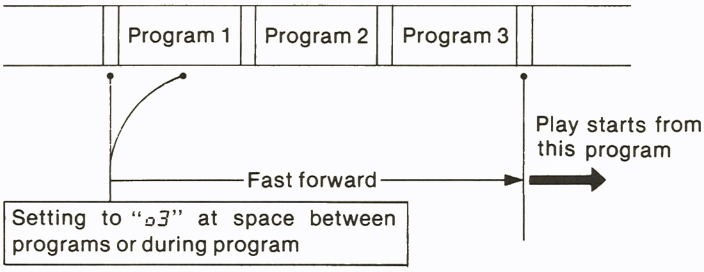
Notes:

- The number of programs to be skipped can be set in either the stop or playback mode.
  When the Pause or Stop button is depressed immediately after the setting has been made in the playback mode, the setting is released.
  When the Pause or Play button is depressed immediately after the setting has been made in the stop mode, the setting may be released.
- When the Stop or Play button is depressed when searching for a program, the skipping program search mode is released.

Counting the number of programs to be skipped

■ When "o3" has been set

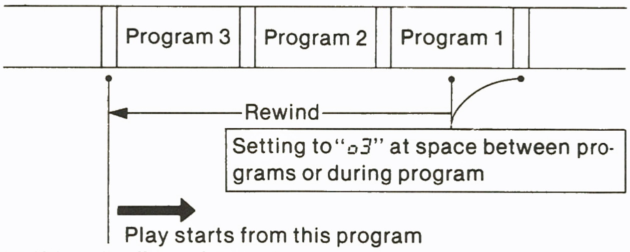
- When searching for programs in the fast forward mode



Setting to "o3" at space between programs or during program

Play starts from this program

- When searching for programs in the rewind mode



Setting to "o3" at space between programs or during program

Play starts from this program

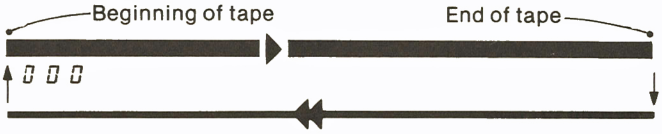
■ When "oo" has been set

- When the tape is fast forwarded, playback will begin from the program following that now heard.
- When the tape is rewound, playback will begin from the start of the program now heard.

(5) Memory repeat playback

When playing back the whole tape repeatedly

1. Set the tape counter to "000" at the position corresponding to the beginning of the tape.
2. Set the Memory repeat button to the "on" position.
3. Depress the Play button and make the tape run.
   When the tape comes to the end, it is rewound automatically and playback begins again automatically from the beginning. This operation is continued 16 times unless the Stop button is depressed.

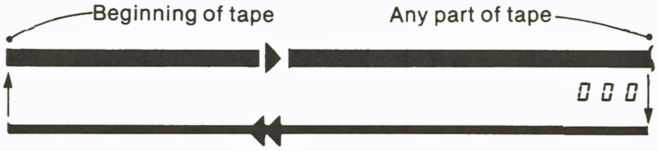


Note:

- Since "000" is detected at the end of the tape, the number of repeats may be reduced to a minimum of 8, depending on the state of the tape.

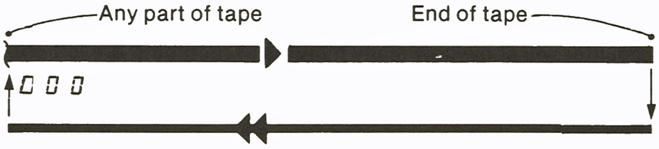
Repeat playback from tape beginning to program somewhere on tape

1. Set the tape counter to "000" at the position where the program whose play is to be repeated ends.
2. Rewind the tape to the beginning.
3. Set the Memory repeat button to the "on" position.
4. Depress the Play button and make the tape run. The tape is rewound automatically to the "000" display and the same playback operation as above is repeated automatically for 16 times.



Repeat playback from a program somewhere on tape to tape end

1. Set the tape counter to "000" at the position where the start of the program is located.
2. Set the Memory repeat button to the "on" position.
3. Depress the Play button and make the tape run. The tape is automatically rewound at the end of the tape and the part of the tape from the "000" display to the end is played back repeatedly 16 times automatically.



Note:

- Always set the Memory repeat button to the "off" position after use.

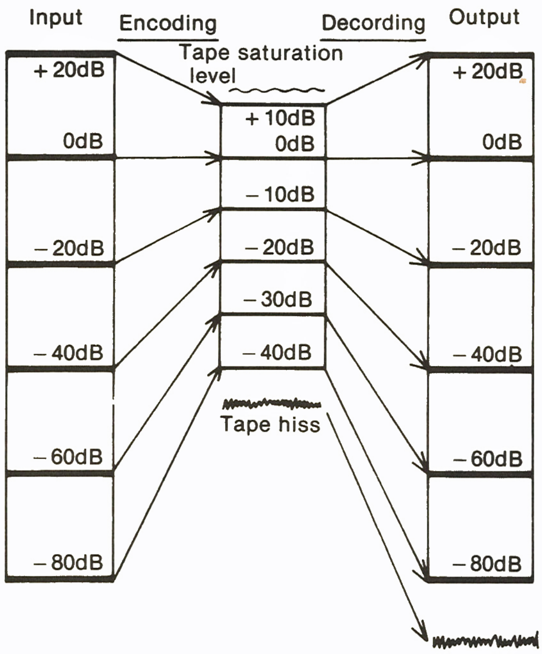
dbx noise reduction system

Features

1. Reduced noise over the whole audible frequency range (more than about "30dB" reduction).
2. The signal is compressed at a high recording level for recording to enable recording with minimal distortion and a wide dynamic range.
3. The linear logarithmic compression and expansion do not make the sound quality undergo change with level mismatching.

Principle of basic operation

The dbx system works to expand the dynamic range by compressing (encoding) the signals and then expanding (decoding) them. As shown in the figure, the input signal level is halved during recording onto the tape. During playback the halved level is doubled to restore the original signal. The figure shows that high signals are greatly expanded (from "+10 dB" to "+20 dB") while low signals are given a low expansion ("−40dB" to "−80dB"). This results in a great improvement in the dynamic range and simultaneously in a great reduction in tape hiss.



Encording/decoding process

"disc" position for "dbx encoded discs"

This unit comes with a "dbx disc" position on the Noise reduction select switch for playing "dbx encoded discs."

Playing "dbx encoded discs"

Operate in the following sequence:

1. Set the input selector on the stereo amplifier to the "tape" position and the record selector to the "phono" position. If the amplifier is capable of tape monitor selection, set the tape monitor switch to the "tape" position and the input selector to the "phono" position.
2. Set the unit to the stop mode and then set the Noise reduction select switch to the "dbx disc" position.
   Disconnect the microphone if one has been connected to the unit.
3. Start operating the turntable.
4. Adjust the unit's Input level controls so that the Fluorescent level meter illumination indicates around "0 dB".
5. Adjust the volume using the control on the stereo amplifier.

Note:

- Do not set the Noise reduction select switch to the "dbx disc" position during tape playback since the sound will then no longer be heard.

Some open-reel type dbx encoded tapes are now available from music stores. These tapes can be played back just like the records by setting the Noise reduction select switch to the "disc" position.

Recording "dbx encoded discs" onto tape

1. Set the Noise reduction select switch to the "dbx disc position."
2. Adjust the recording level, following the "Recording level setting" instructions.
3. Start the recording.
   The sound of the disc is recorded on the tape still in encoded (compressed) form. The decoded (expanded) sound can, however, be monitored (through both the speakers connected to the amplifier and headphones connected to the unit). When playing back a tape which has been recorded in this way, set the Noise reduction select switch to the "dbx tape" position.

* Unlike ordinary records, "dbx encoded discs" have their sound dbx encoded (compressed) when it is cut into the sound grooves. This means that for replay, the sound must be returned to its original form through a decoder (expander). As a result, the noise level is reduced and the dynamic range is increased for a higher record play quality.

Recording with Dolby NR

This unit includes the Dolby NR system, which reduces tape noise to a remarkable degree.

Briefly, the system works as follows: At low sound levels (where tape noise is most noticeable), the high-frequency portion of the sound is recorded at a higher level. Tape noise is not amplified.

During playback, the level of only that portion of the signal which was increased at the time of the recording, as well as tape noise, is reduced by a like amount. This causes the signal to be heard at a normal level, and the tape noise to be reduced significantly.

Noise reduction select switch

• dbx tape:	Used for dbx recording and for replaying dbx recorded tapes.
• dbx disc:	Used for playing dbx encoded discs on a turntable and for recording such discs.
• Dolby NR:	Used for recording with the Dolby NR system and replaying tapes which have been recorded with the Dolby NR system.
• Out:	Used when noise reduction is not required.

DISASSEMBLY INSTRUCTIONS

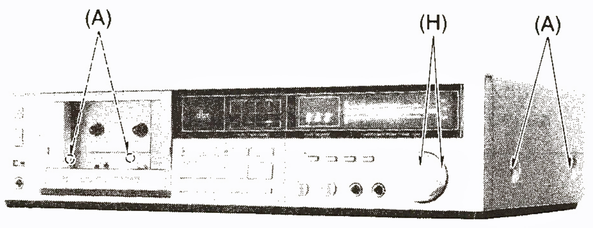


Fig. 1

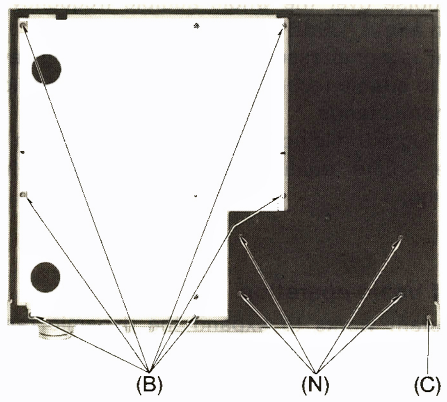


Fig. 2

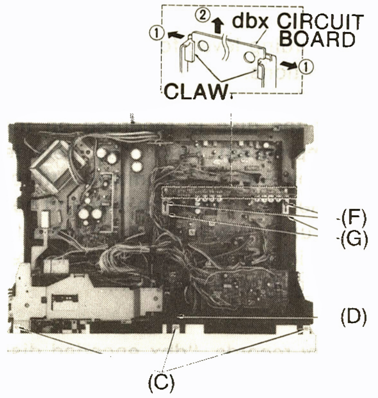

①
②
dbx CIRCUIT BOARD
CLAW
①
(F)
(G)
(D)
(C)

Fig. 3

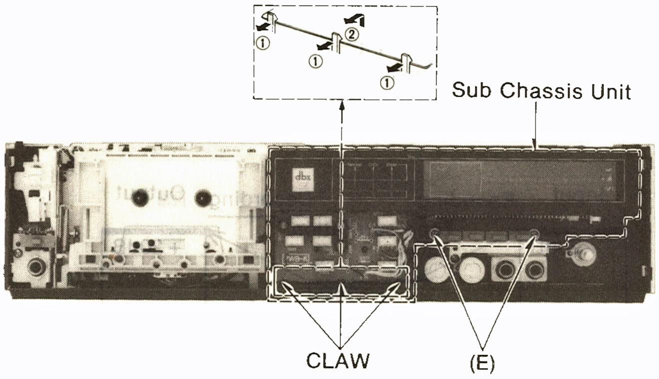

①
②
①
①
Sub Chassis Unit
CLAW
(E)

Fig. 4

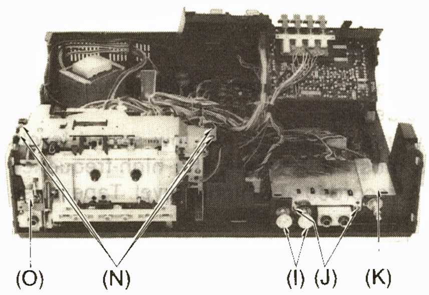


Fig. 5

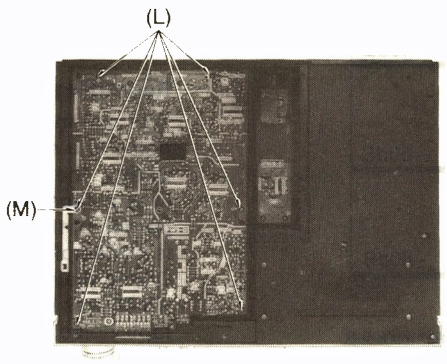


Fig. 6

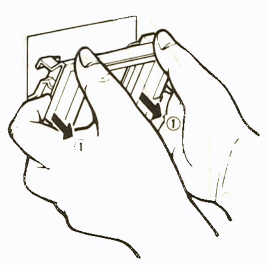


Fig. 7

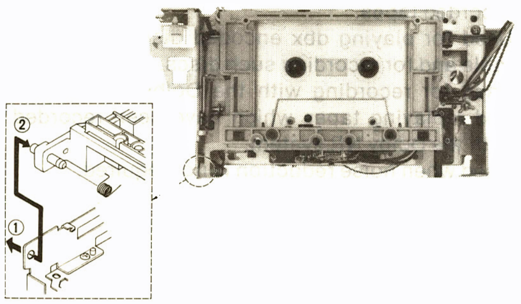


Fig. 8

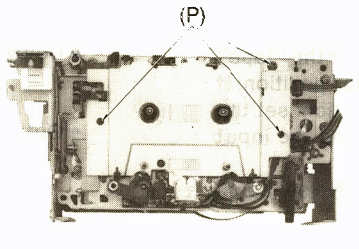


Fig. 9

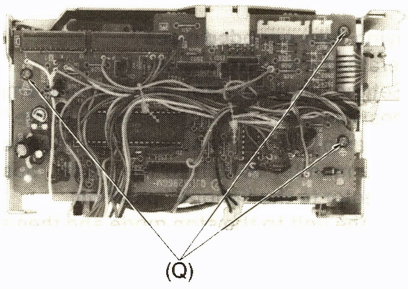
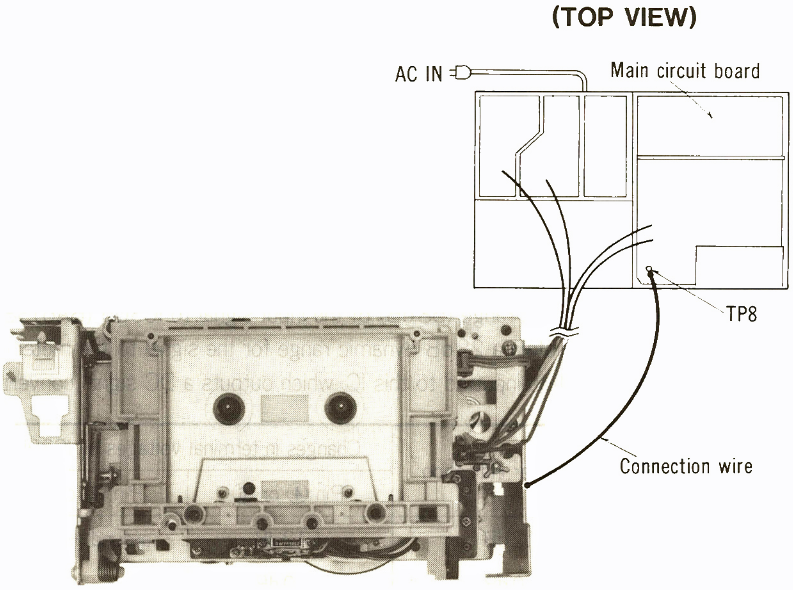


Fig. 10

Ref. No.	Procedure	To remove ——	Remove ——	Shown in fig. ——
1	1	Case cover	• 4 screws ········ (A)	1
2	2	Bottom cover	• 6 screws ········ (B)	2
3	1→2→3	Front panel	• 4 screws ········ (C)	2, 3
4	1→2→3→4	Sub chassis unit	• 1 screw ········ (D)	3
5	1→2→3→4→5	Push switch circuit board	• 2 screws ········ (E)	4
6	1→2→3→4→6	Key board circuit board	• As shown in fig. 4, pull the claw in the direction of arrow ①, the pull key board circuit board in the direction of arrow ②. Then, it can be removed.	4
7	1→7	dbx circuit board	• 2 red screws ········ (F) • dbx P.B. holder ········ (G) • As shown in fig. 3, pull the claw in the direction of arrow ①, then pull dbx circuit board in the direction of arrow ②. Then, it can be removed.	3 3 3
8	1→2→3→4→7→8	Main circuit board	• 2 volume knobs ········ (H) • 2 select knobs ········ (I) • 2 screws ········ (J) • Meter shield plate ········ (K) • 6 red screws ········ (L) • Earth plate-A ········ (M)	1 5 5 5 6 6
9	1→2→3→4→9	Mechanism unit	• 8 screws ········ (N) • Power button ········ (O)	2, 5 5
10	10	Cassette lid	• As shown in fig. 7, pull in the direction of arrow ①. Then, it can be removed.	7
11	1→2→3→4→9→10→11	Cassette holder	• While pushing mechanical chassis in the direction of arrow ①, extract cassette holder in the direction of arrow ②.	8
12	1→2→3→4→9→10→11→12	Mechanism cover	• 3 screws ········ (P)	9
13	1→2→3→4→9→13	Main control circuit board	• 3 screws ········ (Q)	10

• MECHANISM SECTION

1. For repair, measurement or adjustment with the mechanism removed from the unit be sure to ground the lower base plate of the mechanism.
2. For grounding, connect a extension cord to the mechanism's lower base plate and TP8 (earth) from main circuit board.
3. Without grounding, the auto tape selector does not operate properly.



TECHNICHAL EXPLANATION

• DISPLAY SECTION

1. DISPLAY TUBE

Internal display-tube connections are shown below.

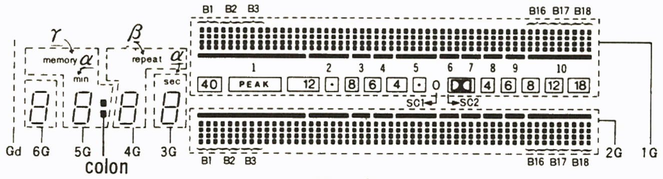

B1 B2 B3
B16 B17 B18
γ
β
α
memory
min
repeat
sec
40
PEAK
1 2 3 4 5 6 7 8 9 10
12 8 6 4 0 4 6 8 12 18
SC1
SC2
Gd 6G 5G 4G 3G
colon
2G 1G

Fig. A

Each segment has a triode configuration (See fig. B).

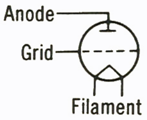

Anode
Grid
Filament

Fig. B

NOTES:

Anode: 1—10, (a)—(g), B1—B18, α—γ, colon
Grid: 1G—6G, Gd

2. DIGITAL COUNTER

1. During tape counter indication, tape count is displayed by the first three digits (6G, 5G, 4G). The bottom digit (fig. C) is used to indicate tape travel and direction as one of the segments (c), (d), (e) and (g) lights (counterclockwise ration for PLAY and FF; clockwise for REW).
2. For tape remaining time indication, all four digits and " : ", "min" and "sec" are used. For recording muting time indication, display elements are the same.
3. Only lower two digits are used to indicate music selection (for jumping up to 20 selections). These functions of the digital counter are controlled by outputs from the microprocessor IC501 via FL driver IC302 and IC303.

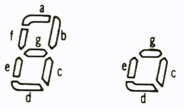


Fig. C

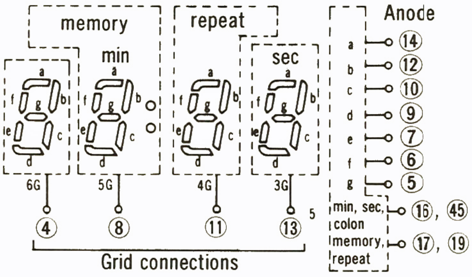

memory
repeat
min
sec
Anode
a ⑭
b ⑫
c ⑩
d ⑨
e ⑦
f ⑥
g ⑤
min, sec, colon ⑯, ㊺
memory, repeat ⑰, ⑲
6G 5G 4G 3G
④ ⑧ ⑪ ⑬
5
Grid connections

Fig. D

3. LEVEL METER

This model uses a level meter IC AN6870N for dynamic lighting indication, featuring a wide range of −40 dB to +18 dB range.

BLOCK DIAGRAM

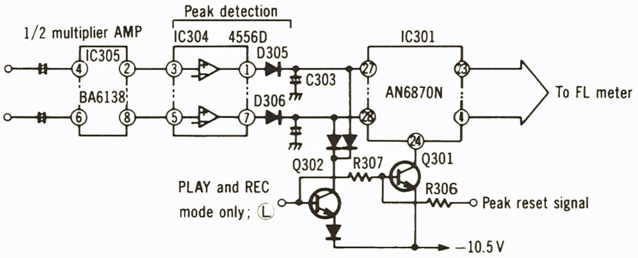

Peak detection
1/2 multiplier AMP
IC305
BA6138
IC304 4556D
D305
D306
C303
IC301
AN6870N
To FL meter
Q302
R307
Q301
R306
PLAY and REC mode only; Ⓛ
Peak reset signal
−10.5 V

Fig. E

CIRCUIT OPERATION

Most conventional level meters using AN6870 (IC301) can only display levels in the range of −20 dB to +8 dB. RS-M255X using the same AN6870, however, is capable of covering a range of −40 dB to +18 dB, which is sufficient for the expanded dynamic range of dbx.

A conventional peak meter circuit follows the IC304, which means a limited display range between −20 dB and +8 dB. To offset this, a 1/2 multiplier circuit is added to the pre-stage to double the display range.

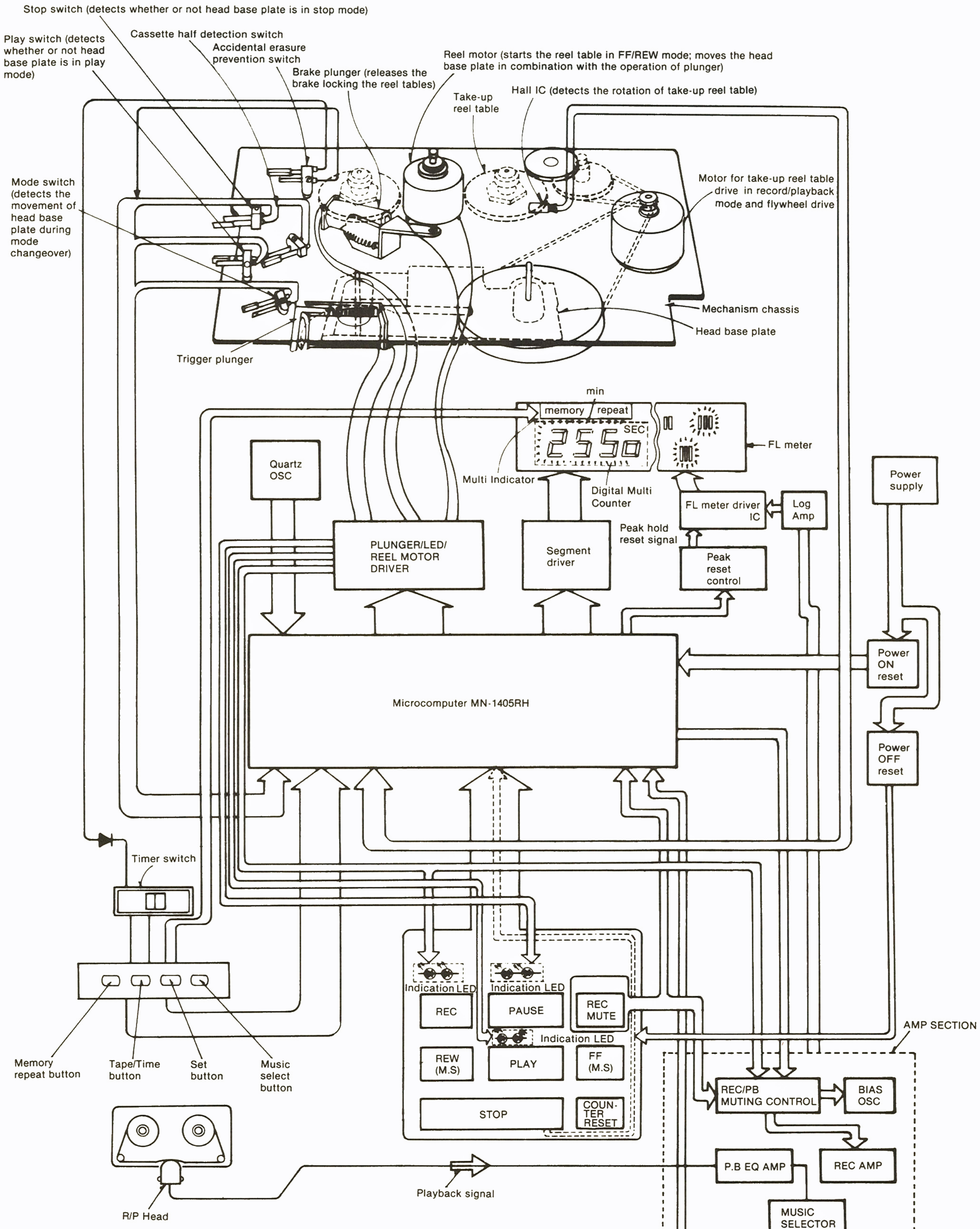
In other words, the dynamic range (58 dB) of the input signal to IC305 (BA6138) is compressed to approximately half (multiplied by 1/2) to obtain a 28 dB dynamic range for the signal to the meter circuit.

Sound signal (AC signal) is inputted to this IC, which outputs a DC signal converted to half of the input.

Level meter indication	Changes in terminal voltages of IC305		LINE OUT voltage
	Pin ④ or ⑥	Pin ② or ⑧	
+12 dB	+12 dB	around +6 dB	+12 dB (1600 mV)
0 dB	0 dB	0 dB	0 dB (400 mV)
−12 dB	−12 dB	around −6 dB	−12 dB (100 mV)

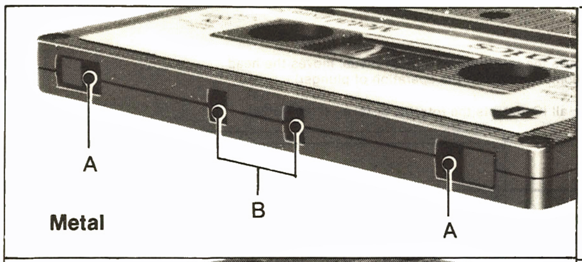
• CONTROL SECTION

RS-M255X contains a microcomputer MN1405RH for various input control buttons, rotation detection, and operation commands. The microcomputer quickly processes signals received from the 19 control switches and a hall IC.

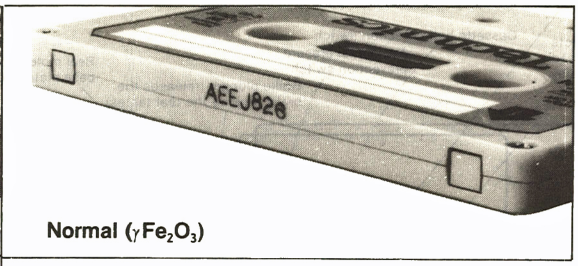

Stop switch (detects whether or not head base plate is in stop mode)
Play switch (detects whether or not head base plate is in play mode)
Cassette half detection switch
Accidental erasure prevention switch
Brake plunger (releases the brake locking the reel tables)
Reel motor (starts the reel table in FF/REW mode; moves the head base plate in combination with the operation of plunger)
Take-up reel table
Hall IC (detects the rotation of take-up reel table)
Mode switch (detects the movement of head base plate during mode changeover)
Motor for take-up reel table drive in record/playback mode and flywheel drive
Mechanism chassis
Head base plate
Trigger plunger
min
memory
repeat
SEC
2550
FL meter
Multi Indicator
Digital Multi Counter
Quartz OSC
PLUNGER/LED/ REEL MOTOR DRIVER
Segment driver
Peak hold reset signal
FL meter driver IC
Log Amp
Peak reset control
Power supply
Power ON reset
Microcomputer MN-1405RH
Power OFF reset
Timer switch
Memory repeat button
Tape/Time button
Set button
Music select button
Indication LED
Indication LED
REC
PAUSE
REC MUTE
Indication LED
REW (M.S)
PLAY
FF (M.S)
STOP
COUN-TER RESET
AMP SECTION
REC/PB MUTING CONTROL
BIAS OSC
P.B EQ AMP
REC AMP
MUSIC SELECTOR
Playback signal
R/P Head

• AUTO TAPE SELECTOR

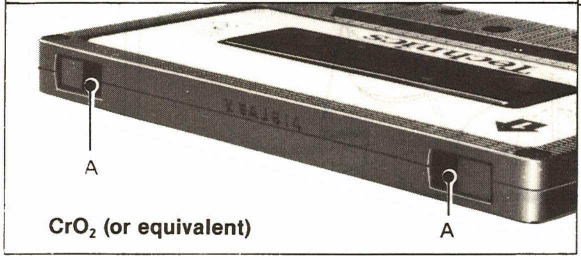
This unit is equipped with an auto-tape selector system that detects these identification recesses and automatically selects the correct bias and equalization for Normal, CrO_2 and Metal tape varieties.
Thus, the novice user can obtain the correct tape selector setting automatically to ensure proper recording and playback results.



Metal



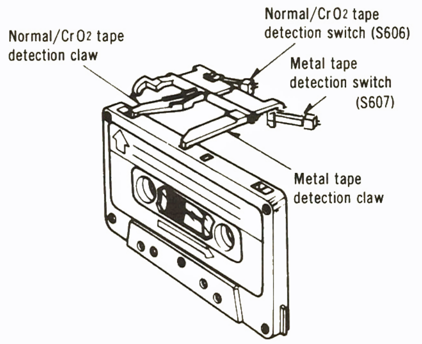
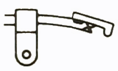
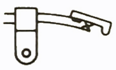
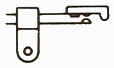
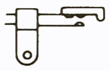
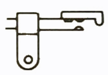
Normal (γFe_2O_3)



CrO_2 (or equivalent)

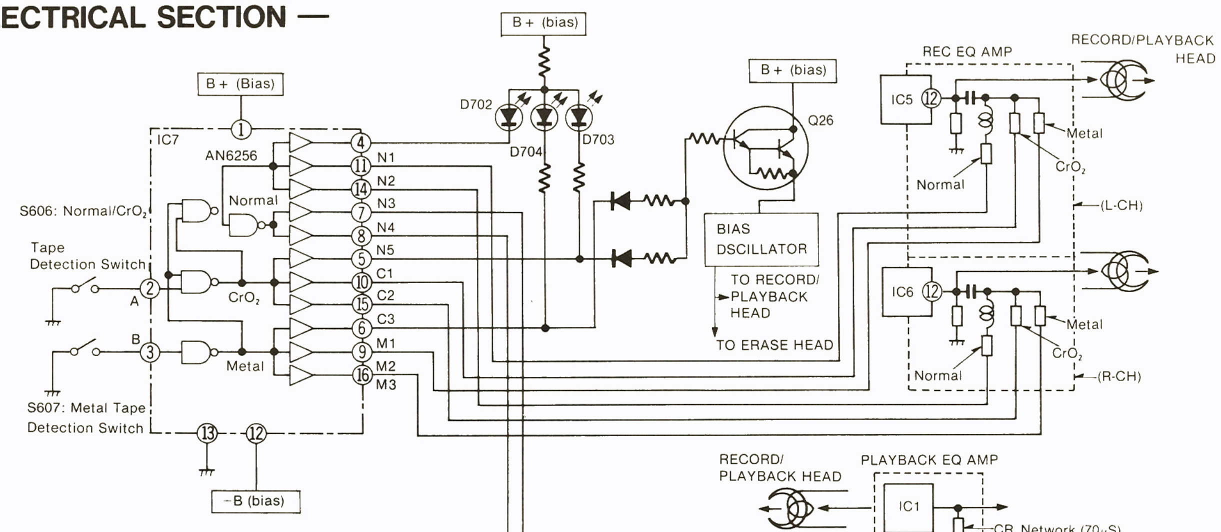
Type \ Recess	A	B
Metal	YES	YES
CrO_2	YES	NO
Normal	NO	NO

— MECHANICAL SECTION —

	S607	S606	Mode
			Normal tape mode
			CrO_2 tape mode
			Metal tape mode

Normal/CrO2 tape detection claw
Normal/CrO2 tape detection switch (S606)
Metal tape detection switch (S607)
Metal tape detection claw

— ELECTRICAL SECTION —


B+ (bias)
B+ (Bias)
B+ (bias)
REC EQ AMP
RECORD/PLAYBACK HEAD
IC7
AN6256
①
④ N1
⑪ N2
⑭ N3
⑦ N4
⑧ N5
⑤ C1
⑩ C2
⑮ C3
⑥ M1
⑨ M2
⑯ M3
Normal
CrO2
Metal
S606: Normal/CrO2 Tape Detection Switch
A ②
B ③
S607: Metal Tape Detection Switch
⑬
⑫
–B (bias)
D702
D704
D703
Q26
BIAS OSCILLATOR
TO RECORD/PLAYBACK HEAD
TO ERASE HEAD
IC5 ⑫
Metal
CrO2
Normal
(L-CH)
IC6 ⑫
Metal
CrO2
Normal
(R-CH)
RECORD/PLAYBACK HEAD
PLAYBACK EQ AMP
IC1
CR Network (70μS)
RECORD/PLAYBACK HEAD
IC2
CR Network (70μS)

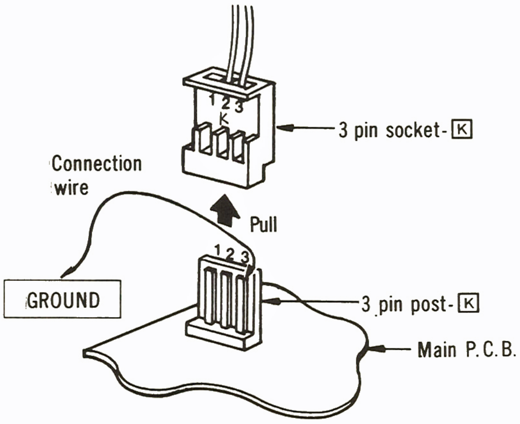
Truth Value Table (IC7)

Tape mode	Input A	Input B	Output N1—N3	Output N4—N5	Output C1—C3	Output M1—M3
Normal	L	L	L	H	H	H
	L	H	H	L	H	L
CrO_2	H	L	H	L	L	H
Metal	H	H	H	L	H	L

MEASUREMENT & ADJUSTMENT METHODS

Tape selector (Tape mode switching)

For measurement adjustment with test tapes without tape detection holes (A and B), switch tape modes as follows.
(For normal tape mode, just insert a normal tape into the cassette holder.)


1 2 3
K
3 pin socket-🄺
Connection wire
Pull
1 2 3
GROUND
3 pin post-🄺
Main P.C.B.

*** Metal tape mode setting:**

Metal tape mode is obtained by disconnecting the 3 pin socket 🄺 from the 3 pin post 🄺 on the P.C.B. (Printed Circuit Board).

*** CrO2 tape mode setting:**

First, disconnect the 3 pin socket 🄺 in the same way as above. Then, as illustrated in the figure right, connect the terminal-3 of the 3 pin post to the ground with a connection wire.

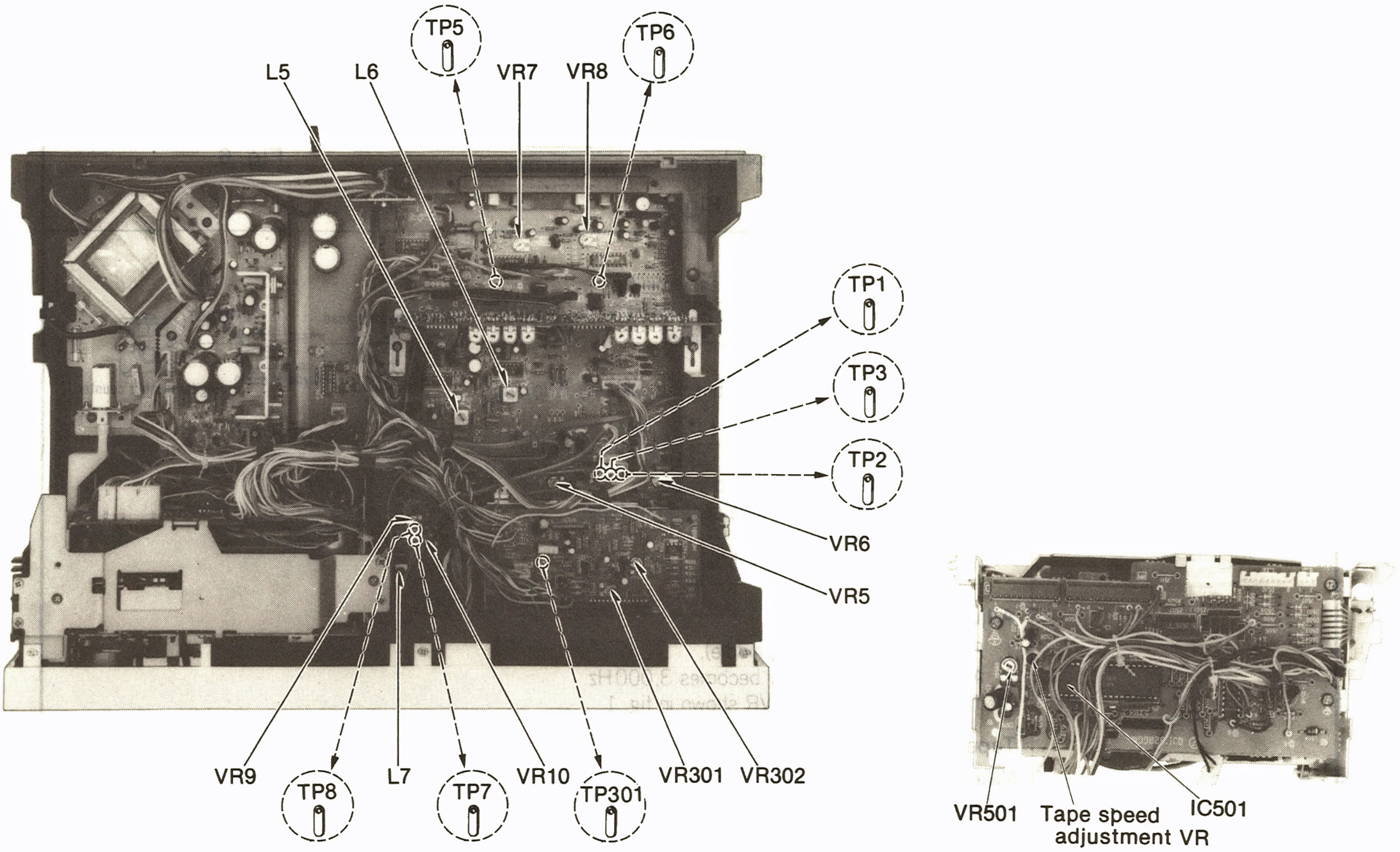
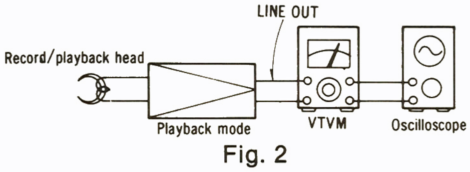
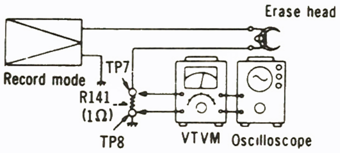
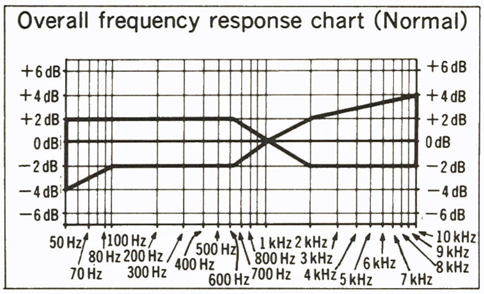
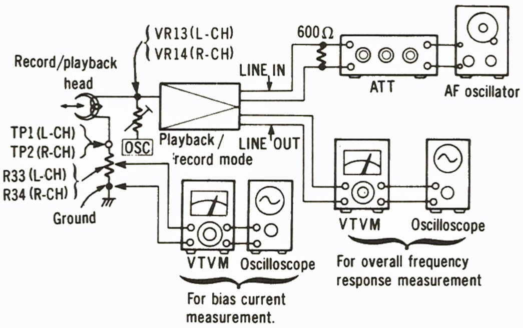

TP5
TP6
L5
L6
VR7
VR8
TP1
TP3
TP2
VR6
VR5
VR9
TP8
L7
TP7
VR10
TP301
VR301
VR302
VR501
Tape speed adjustment VR
IC501

Fig. 1

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20±5°C (68±9°F)
- NR switch: OUT
- Timer start switch: OFF
- Input level controls: Maximum
- Output level control: Maximum

ITEM	MEASUREMENT & ADJUSTMENT
Ⓐ Head azimuth adjustment Condition: * Playback mode	**L-CH/R-CH output balance adjustment** 1. Make connections as shown in fig. 2.  LINE OUT Record/playback head Playback mode VTVM Oscilloscope Fig. 2

ITEM	MEASUREMENT & ADJUSTMENT
Ⓓ Playback gain Condition: * Playback mode * Normal tape mode Equipment: * VTVM * Oscilloscope * Test tape ··· QZZCFM	1. Test equipment connection is shown in fig. 2. 2. Playback standard recording level portion on test tape (QZZCFM 315 Hz, 0 dB), and using VTVM measure the output level at LINE OUT jack. 3. Make measurement for both channels. **Standard value: 0.7V±1dB** **〔around 0.42V: at test points TP5 (L-CH) and TP6 (R-CH)〕** **Adjustment** 1. If measured value is not within standard, adjust VR5 (L-CH), VR6 (R-CH) (shown in fig. 1). 2. After adjustment, check "Playback frequency response" again.
Ⓔ Erase current Condition: * Record mode * Metal tape mode Equipment: * VTVM * Oscilloscope	1. Test equipment connection is shown in fig. 9. 2. Place UNIT into metal tape mode. 3. Press the record and pause buttons. 4. Read voltage on VTVM and calculate erase current by following formula: $\text{Erase current (A)} = \frac{\text{Voltage across both ends of R141}}{1\ (\Omega)}$ **Standard value: 155±15 mA (Metal position)**  Erase head Record mode TP7 R141 (1Ω) TP8 VTVM Oscilloscope **Fig. 9** 5. If measured value is not within standard, adjust as follows. **Adjustment** 1. Open the point (B) and short the point (A) on the main circuit board in the circuit board diagram (See page 41). 2. Make measurement for erase current. 3. Make sure that the measured value is within the erase current of 140 mA to 170 mA. 4. If it is beyond the value, carry out the following adjustments: • If the erase current is less than 140 mA, open the point (A). • If the erase current is more than 170 mA, short the points (A) and (B).
Ⓕ Overall frequency response Condition: * Record/playback mode * Normal tape mode * CrO$_2$ tape mode * Metal tape mode * Input level controls ··· MAX * Output level control ··· MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω) * Test tape (reference blank tape) ··· QZZCRA for Normal ··· QZZCRX for CrO$_2$ ··· QZZCRZ for Metal	**Note:** Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).  **Fig. 10** **Overall frequency response adjustment by recording bias current** (Recording equalizer is fixed) 1. Make connections as shown in fig. 11. 2. Place UNIT into normal tape mode and load the test tape (QZZCRA). 3. Input a 1 kHz, −24 dB signal through LINE IN. Place the set in record mode. 4. Fine adjust the attenuator to obtain 0.7 V LINE OUT output. * Make sure that the input signal level is −24±4 dB with 0.7 V output voltage. 5. Adjust the attenuator to reduce the input signal level by 20 dB. 6. Adjust the AF oscillator to generate 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz and 10 kHz signals, and record these signals on the test tape.  VR13 (L-CH) VR14 (R-CH) 600 Ω Record/playback head LINE IN ATT AF oscillator TP1 (L-CH) TP2 (R-CH) OSC Playback / record mode LINE OUT R33 (L-CH) R34 (R-CH) Ground VTVM Oscilloscope For bias current measurement. VTVM Oscilloscope For overall frequency response measurement **Fig. 11** 7. Playback the signals recorded in step 6, and check if the frequency response curve is within the limits shown in the overall frequency response chart for normal tapes (fig. 10). (If the curve is within the charted specifications, proceed to steps 8, 9, 10 and 11.) If the curve is not within the charted specifications, adjust as follows;

ITEM | **MEASUREMENT & ADJUSTMENT**

Adjustment Ⓐ:

When the curve exceeds the overall frequency response chart specifications (fig. 10) as shown in fig. 12.

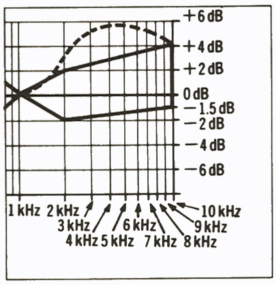


Fig. 12

1) Increase bias current by turning VR9 (L-CH) and VR10 (R-CH). (See fig. 1 on page 11.)
2) Repeat steps 6 and 7 to confirm. (Proceed to steps 8, 9, 10 and 11 if the curve is now within the charted specifications is fig. 10.)
3) If the curve still exceeds the specifications (fig. 10), increase bias current further and repeat steps 6 and 7.

Adjustment Ⓑ:

When the curve falls below the overall frequency response chart specifications (fig. 10) as shown in fig. 13.

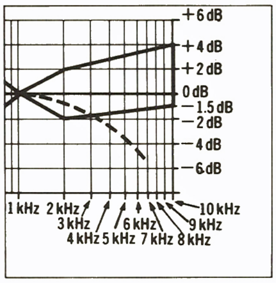


Fig. 13

1) Reduce bias current by turning VR9 (L-CH)) and VR10 (R-CH).
2) Repeat steps 6 and 7 to confirm. (Proceed to steps 8, 9, 10 and 11 if the curve is now within the charted specifications in fig. 10.)
3) If the curve still falls below the charted specifications (fig. 10), reduce bias current further and repeat steps 6 and 7.

8. Place UNIT into CrO_2 tape mode.
9. Change test tape to QZZCRX, and record 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 12.5 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO_2 tapes (fig. 14).
10. Place UNIT into metal tape mode change test tape to QZZCRZ, and record 50 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 12.5 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for metal tapes (fig. 14).
11. Confirm that bias currents are approximately as follows when the UNIT is set at different tape mode.
    - * Read voltage on VTVM and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$$

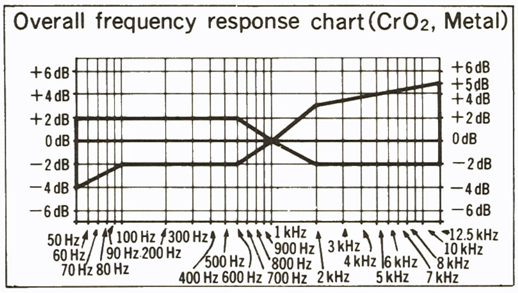

Overall frequency response chart (CrO_2, Metal)

Fig. 14

Standard value:
around 340 μA (Normal position)
around 440 μA (CrO_2 position)
around 710 μA (Metal position)
}: measured at TP1 (L-CH) and TP2 (R-CH)

Ⓖ Overall gain

Condition:
- * Record/playback mode
- * Normal tape mode
- * Input level controls ··· MAX
- * Output level control ··· MAX
- * Standard input level;
  - MIC ········ −72 ± 3 dB
  - LINE IN ··· −24 ± 3 dB

Equipment:
- * VTVM
- * AF oscillator
- * ATT
- * Oscilloscope
- * Resistor (600 Ω)
- * Test tape (reference blank tape) ··· QZZCRA for Normal

1. Test equipment connection is shown in fig. 15.
2. Place UNIT into normal tape mode, and load the test tape (QZZCRA).
3. Place UNIT into record mode.
4. Supply 1 kHz signal (−24 dB) from AF oscillaror, through ATT to LINE IN.
5. Adjust ATT until monitor level at LINE OUT becomes 0.7 V.
6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.7 V.
7. If measured value is not 0.7 V, adjust VR7 (L-CH), VR8 (R-CH).
8. Repeat from step (2).

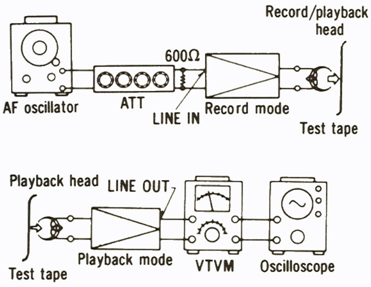


Fig. 15

ITEM / **MEASUREMENT & ADJUSTMENT**

Equipment:
- VTVM
- Oscilloscope
- Test tape (azimuth) ··· QZZCFM

2. Playback the 8 kHz signal from the test tape (QZZCFM).
   Adjust screw (B) in fig. 3 for maximum output L-CH and R-CH levels.
   When the output levels of L-CH and R-CH are not at maximum at the same time, readjust as follows.
3. Turn the screw shown in fig. 3 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate the angle B between angles A and C, i.e., a point where L-CH and R-CH output levels come together at maximum. (Refer to figs. 3 and 4.)

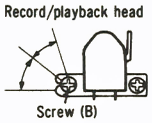


Fig. 3

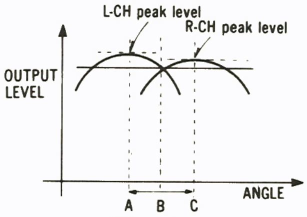


Fig. 4

L-CH/R-CH phase adjustment

4. Make connections as shown in fig. 5.
5. Playback the 8 kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 3 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 6 is obtained on the oscilloscope.

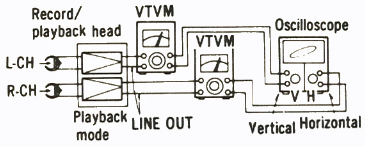


Fig. 5

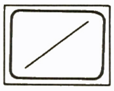


Fig. 6

Ⓑ Tape speed

Condition:
- Playback mode
- Normal tape mode

Equipment:
- Digital electronic counter
- Test tape ··· QZZCWAT

Tape speed accuracy

1. Test equipment connection is shown in fig. 7.
2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to frequency counter.
3. Measure this frequency.
4. On the basis of 3,000 Hz, determine value by following formula:

$$\text{Tape speed accuracy} = \frac{f - 3{,}000}{3{,}000} \times 100\ (\%)$$

where, f = measured value

5. Take measurement at middle section of tape.

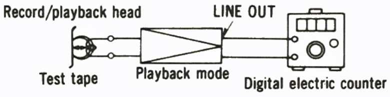


Fig. 7

Standard value: ±1.5%

Adjustment method

1. Playback the test tape (middle).
2. Adjust so that frequency becomes 3,000 Hz.
3. Tape speed adjustment VR shown in fig. 1.

Tape speed fluctuation

Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows:

$$\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3{,}000} \times 1000\ (\%)$$

f_1 = maximum value, f_2 = minimum value

Standard value: Less than 1.0%

Ⓒ Playback frequency response

Condition:
- Playback mode
- Normal tape mode

Equipment:
- VTVM
- Oscilloscope
- Test tape ··· QZZCFM

1. Test equipment connection is shown in fig. 2.
2. Place UNIT into playback mode.
3. Playback the frequency response test tape (QZZCFM).
4. Measure output level at 12.5 kHz, 8 kHz, 4 kHz, 1 kHz, 250 Hz, 125 Hz and 63 Hz, and compare each output level with the standard frequency 315 Hz, at LINE OUT.
5. Make measurement for both channels.
6. Make sure that the measured value is within the range specified in the frequency response chart. (Shown in fig. 8.)

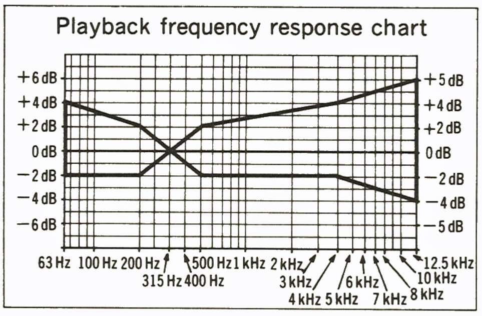
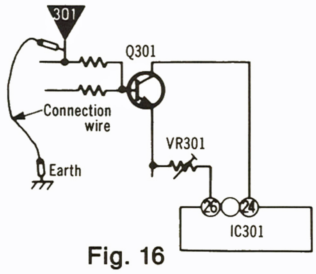
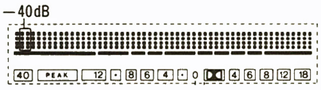
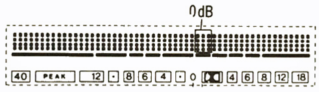
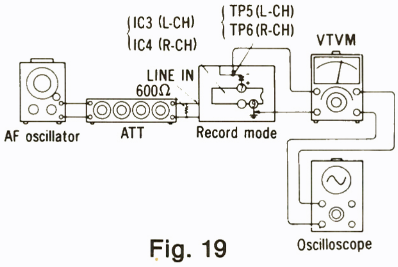
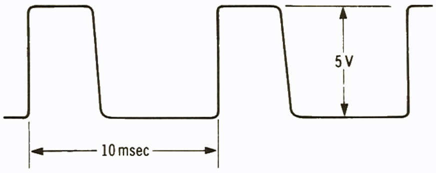
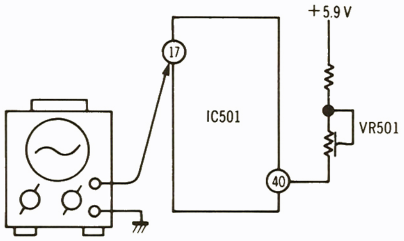
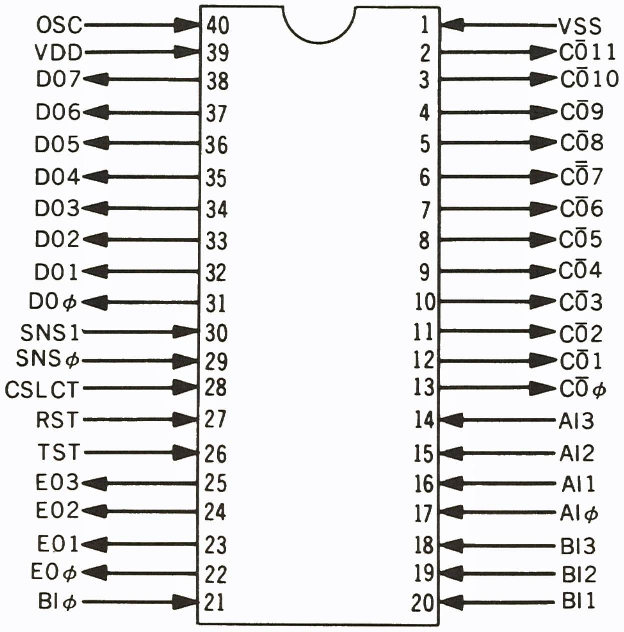


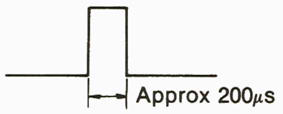
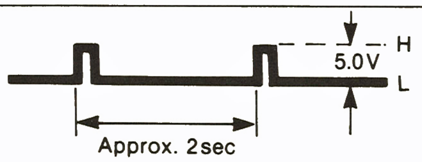
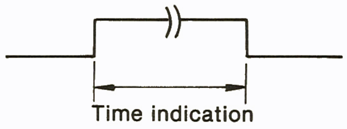
Fig. 8

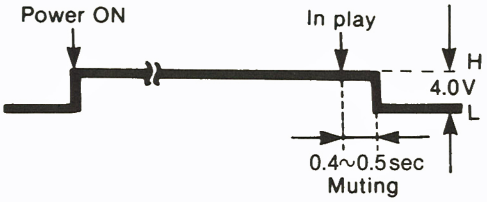
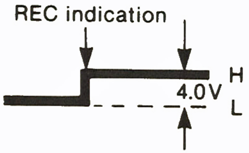
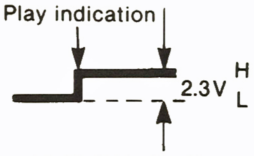
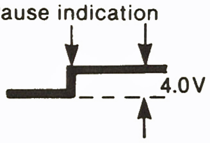
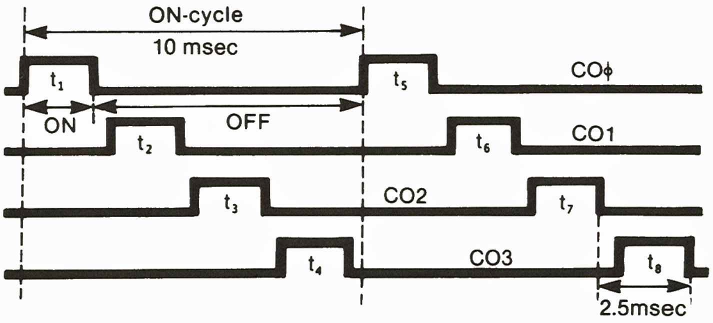
ITEM	MEASUREMENT & ADJUSTMENT
Ⓗ Fluorescent meter Condition: * Record mode * Input level controls ··· MAX * Output level control ··· MAX Equipment: * VTVM * AF oscillator * ATT	1. Make connections as shown (See fig. 15). 2. Connect a wire between TP301 and ground terminal (See fig. 16). 3. In the recording pause mode, apply 1 kHz (−24 dB) to LINE IN. 4. Adjust ATT so that output level at LINE OUT is 0.7 V.  301 Q301 Connection wire Earth VR301 26 24 IC301 Fig. 16 **−40 dB adjustment** 5. Adjust ATT so that the level adjusted at step 4 is reuced by 40 dB. 6. At this time, check that −40 dB indicator is lighted halfway (intermediate brightness between full brightness and light-out: See fig. 17). 7. If the indicator is not lighted halfway as described in step 6, adjust VR302.  −40dB 40 PEAK 12 8 6 4 0 4 6 8 12 18 Fig. 17  0dB 40 PEAK 12 8 6 4 0 4 6 8 12 18 Fig. 18 **0 dB adjustment** 8. Restore the condition of step 4 (set LINE OUT output level to 0.7 V). 9. At this time, check that 0 dB indicator is lighted halfway (intermediate brightness between full brightness and light-out: See fig. 18). 10. If improper, adjust VR301. 11. Repeat adjustments and checks at steps 4, 5, 6, 7, 8, 9 and 10 two or three times. 12. Disconnect the wire between TP301 and ground terminal, which had been connected at step 2.
Ⓘ Dolby NR circuit Condition: * Record mode * Dolby NR switch ··· IN/OUT * Input level controls ··· MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω)	1. Test equipment connection is shown in fig. 20. 2. Place UNIT into record mode, set the Dolby NR switch to OUT position and supply to LINE IN to obtain −34.5 dB at PIN ⑦ [IC3 (L-CH), IC4 (R-CH)] (frequency 5 kHz). 3. Confirm that the value at IN position is 8 (±2.5) dB greater than the value at OUT position of Dolby NR switch.  IC3 (L-CH) IC4 (R-CH) TP5 (L-CH) TP6 (R-CH) VTVM LINE IN 600Ω AF oscillator ATT Record mode Oscilloscope Fig. 19
Ⓙ Input scanning time adjustment Condition: * Stop mode Equipment: * Oscilloscope	1. Connect oscilloscope to ⑰ terminal of IC501. 2. Measure the time of input scanning signal with oscilloscope as shown in fig. 20. **Standard value: About 10 msec** 3. If the measured value is markedly different from the signal shown below, make the necessary adjustment with VR501.   +5.9 V 17 IC501 VR501 40 Fig. 20

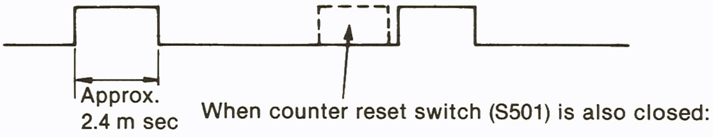
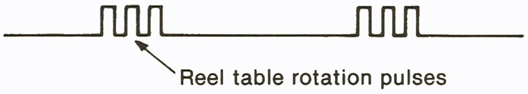
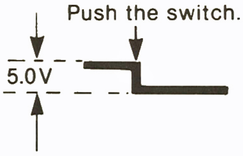
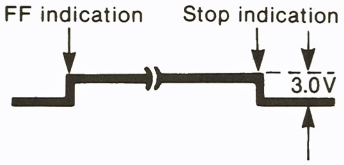
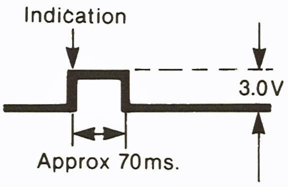
MN1405RH (IC501) EACH TERMINAL FUNCTION AND WAVEFORM

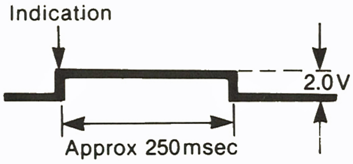
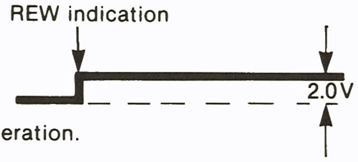
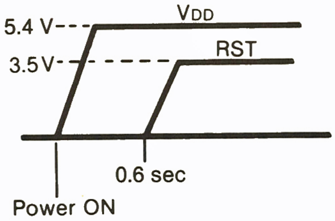
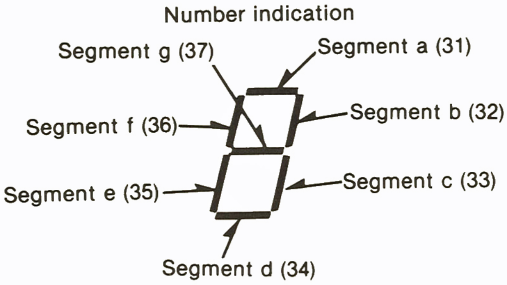
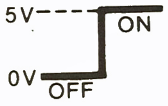
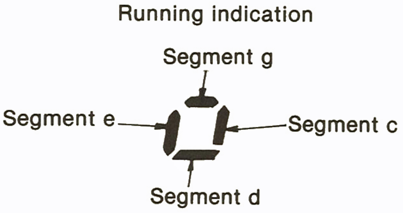
(BOTTOM VIEW)

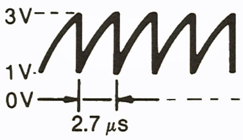

OSC 40
VDD 39
DO7 38
DO6 37
DO5 36
DO4 35
DO3 34
DO2 33
DO1 32
DOϕ 31
SNS1 30
SNSϕ 29
CSLCT 28
RST 27
TST 26
EO3 25
EO2 24
EO1 23
EOϕ 22
BIϕ 21
1 VSS
2 CŌ11
3 CŌ10
4 CŌ9
5 CŌ8
6 CŌ7
7 CŌ6
8 CŌ5
9 CŌ4
10 CŌ3
11 CŌ2
12 CŌ1
13 CŌϕ
14 AI3
15 AI2
16 AI1
17 AIϕ
18 BI3
19 BI2
20 BI1

Terminal No.	Symbol	Name	Function/operation
1.	VSS	GND	
2.	CŌ11	TIMER REC•PLAY Signal output	 Approx 200μs Becomes "H" level only when power is supplied.
3.	CŌ10	FL meter reset	 H 5.0V L Approx. 2sec This output is for resetting the Peak Hold of the FL Meter. The pulse 2.5msec. width is transmitted in approx. 2-second cycles, regardless of the mechanism operation.
4.	CŌ9	TIME OUT	Not used.  Time indication Becomes "H" level only during time indication
5.	CŌ8	No connection	Not used.

Terminal No.	Symbol	Name	Function/operation
6.	$C\overline{O}7$	Muting	 Power ON In play H 4.0V L 0.4~0.5sec Muting "L" level 0.4 to 0.5 second after "PLAY" finish. "H" level in PAUSE, FF, REW STOP. "L" level approx. 0.4 second after "REC PAUSE" is switched to REC. "L" level approx. 0.4 second after command in case PAUSE mode is set to REC command.
7.	$C\overline{O}6$	REC indication	 REC indication H 4.0V L "H" level simultaneously with REC indication. "H" level immediately after power is ON in TIMER REC mode. "H" level held if in TIMER REC position, when STOP AUTO RESET mechanism operates.
8.	$C\overline{O}5$	PLAY indication	 Play indication H 2.3V L "H" level simultaneously with PLAY indication. Same as the above for TIMER PLAY.
9.	$C\overline{O}4$	PAUSE indication	 Pause indication 4.0V "H" level simultaneously with PAUSE indication.
10.	$C\overline{O}3$	FL grid & input SW. scan	 ON-cycle 10 msec ON OFF t_1 t_2 t_3 t_4 t_5 t_6 t_7 t_8 COϕ CO1 CO2 CO3 2.5msec
11.	$C\overline{O}2$	FL grid & input SW. scan	
12.	$C\overline{O}1$	FL grid & input SW. scan	
13.	$C\overline{O}ϕ$	FL grid & input SW. scan	

Terminal No.	Symbol	Name	Function/operation
14.	A13	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the cassette half detection leaf switch (S605) is ON, this terminal is connected to the HALL IC, MUSIC SELECT switch (S512) and SET switch (S511)).
15.	A12	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the mode leaf switch (S602) is ON, this terminal is connected to the accidental erasing protection leaf switch (S601), memory repeat switch (S509), TAPE/TIME switch (S510) and TIMER PLAY switch (S513)).
16.	A11	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the play leaf switch (S604) is ON, this terminal is connected to the REC MUTE switch (S508)).
17.	A1ϕ	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3 (when the stop leaf switch (S603) is ON, this terminal is connected to the counter reset switch (S501).
			Operation example Counter reset switch (S501) and stop switch (S603) are connected to A10. If only S603 is closed, the waveform is as follows:  Approx. 2.4 m sec When counter reset switch (S501) is also closed: Cassette half detection switch (S605), HALL IC output, MUSIC SELECT switch (S512) and SET switch (S511) are connected to A13. If all switches are OFF, the following waveform is obtained in FF or REW mode. 
18. 19. 20. 21.	Bi3 Bi2 Bi1 Biϕ	REW key FF key PLAY key STOP key	 "H" in the normal case, "L" when the switch is pushed.
22.	EOϕ	Brake plunger	 "H" during FF/REW operations.
23.	EO1	Trigger plunger	 "H" until MODE SW is closed after the input to switch the mechanism, such as PLAY, PAUSE, STOP, etc. has been applied. (Approx. 70ms. depending on the mechanism condition.)

Terminal No.	Symbol	Name	Function/operation
24.	E$\overline{\text{O}}$2	Motor CL	 Indication 2.0V Approx 250msec "H" until MODE SW is changed from "close" to "open" following the indication that the mechanism mode has been changed.  REW indication 2.0V "H" in REW operation.
25.	E$\overline{\text{O}}$3	Motor UNCL	Same as the above in MODE conversion. "H" during FF (Cue).
26.	TST	Chip test	Connected to GND.
27.	RST	RESET	Computer's RESET terminal. Reset is less than 0.8V.  VDD 5.4 V RST 3.5V 0.6 sec Power ON
28.	CSLCT	CSLCT	Connected to GND.
29.	SNSϕ	Input switch state reading	Reads switch states corresponding to scanning of CO ϕ — 3. (This terminal is connected to REC switch (S503), PAUSE switch (S502), switch detecting pulses between signal portions and TIMER REC switch (S513).
30.	SNS1	Reference signal reading	Time caount reference signal: approx. 1446 Hz
31.	D$\overline{\text{O}}\phi$	FL counter Segment a	 Number indication Segment g (37) Segment a (31) Segment f (36) Segment b (32) Segment e (35) Segment c (33) Segment d (34)   Running indication Segment g Segment e Segment c Segment d Counter number changes when takeup reel table rotates two turns. Each segment of running indication changes when the reel table rotates a half turn. Waveforms change since dynamic lighting is used.
32.	D$\overline{\text{O}}$1	FL counter Segment b	
33.	D$\overline{\text{O}}$2	FL counter Segment c	
34.	D$\overline{\text{O}}$3	FL counter Segment d	
35.	D$\overline{\text{O}}$4	FL counter Segment e	
36.	D$\overline{\text{O}}$5	FL counter Segment f	
37.	D$\overline{\text{O}}$6	FL counter Segment g	

Terminal No.	Symbol	Name	Function/operation
38.	DO7	No connection	Not used.
39.	VDD	Power source	Operated at 4.5V to 6.0V.
40.	OSC	Oscillation terminal	 Oscillation is approx. 370 kHz. Because the connection of a probe affects the terminal, nothing should be connected to this terminal for any other measurements. Use COϕ to 3 in measuring the computer's velocity; Approx. 100 Hz in STOP condition.

TROUBLESHOOTING OF MAIN CONTROL CIRCUIT

Fault	Probable cause	Microcomputer terminal to check	Relevant mechanism parts	Relevant external parts
Mechanism dose not operate at all.				
FL not lighting	Microcomputer not operating			
	Power not supplied.	39 (VDD)		
	Clock not oscillating.	40 (OSC 10 to 13		C503, C504 VR501 to R514
	Reset locked.	27 (RST)		C511, C506, Q506, Q401, R513, R512
	Microcomputer normal. (Scan normal)			
	Connection to FL Driver.	10 to 13 31 to 37		
FL lighting OK. (MODE LED not lighting.)	Half SW. closed.	14 (Ai3)	Half SW.	D502
MODE indicator lighting OK.	Motor circuit faulty.	24, 25	Motor connection	IC502

Fault	Probable cause	Microcomputer terminal to check	Relevant mechanism parts	Relevant external parts
Mechanism defective.				
FF/REW reverse rotation.	Reverse connection of motor.	24, 25	Motor connection	IC502
FF/REW motor rotating, reel not rotating.	Brake plunger not being with drawn.	22 (EOϕ)	Brake plunger disconnection, etc.	IC502
CAM continuous rotation in PLAY.	MODE SW. defective.	15 (Ai2)	MODE SW.	D505, D501
Motor rotating in PLAY, but CAM's not switched.	Trigger plunger not operating	23 (EO1)	Trigger plunger	IC502
Motor rotates in reveise and does not stop after switching to PLAY or PAUSE.	PLAY or STOP SW, defective.	16 (Ai1) 17 (Aiϕ)	STOP PLAY Leaf SW.	D504, Q502 D503, D511
REC IND. due not light up. (Operation is normal)	LED or drive transistor defective.	7 (CO6)		IC502
PLAY IND. dues not light up.	- do -	8 (CO5)		IC502
PAUSE IND. dues not light up.	- do -	9 (CO4)		IC502
Not counting.	Hall IC faulty, buffer circuit faulty.	14 (Ai3)	Reel magnet	IC503 (Hall IC) Q501, D502
AUTO STOP functioning soon after operation begins.	Same as the above. (Not counting)			
No muting.	Muting output connection etc.	6 (CO7)		
No peak-resetting.	Connection	3 (CO10)		Q301
Accidental erase prevention mechanism not functioning.	Leaf SW	15 (Ai2)	Accidental erasure Leaf SW	D501, 505
Operating during EJECT.	Half detection SW.	14 (Ai3)	Half detection SW.	D502

OUTLINE OF dbx SYSTEM

In 1971, the dbx company of Massachusetts, U.S.A., succeeded in developing a logarithmic compression/expansion system for audio signals which extends across an extremely wide amplitude range and results in a very low distortion rate.

In this system, the dynamic range of the input signal is compressed to 1/2 its original level (measured in decibels), and then recorded. The recorded signal is then expanded (2x) prior to playback, in order to restore it to the original level. By this process, a dynamic range exceeding 100dB can be easily obtained by using an ordinary tape recorder.

This system is referred to as a decilinear noise reduction system, but is generally called the "dbx system",the name being derived from the dbx company.

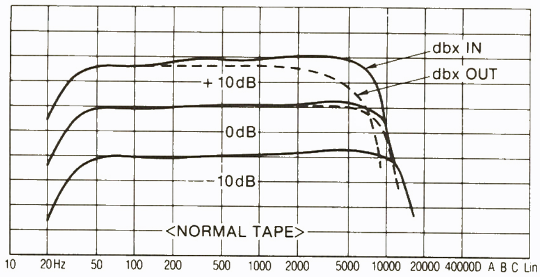
• The features of the dbx system

1. A significant noise reduction (approximately 30dB or more) is obtained over the entire audible frequency range.

Noise reduction mode	S/N ratio RS-M255X	Remarks
Noise reduction "OUT"	58dB	CrO_2 tape, peak level
Dolby NR "IN"	66dB	CrO_2 tape, peak level
dbx "IN"	92dB	CrO_2 tape, peak level

2. A great improvement in the dynamic range makes it possible to extend the range to 110dB (at 1kHz, CrO_2 tape).
3. The direct logarthmic method of compression and expansion protects against problems caused by level mismatching.
4. Even if phase distortion occurs in the signal transmission system, precise operation is maintained by means of the RMS level detector.
5. A low distortion rate is maintained throughout the frequency range.
    - Improvement of high frequency response. The dbx system solves the problem of deteriorated high frequency at higher input levels which is an inherent fault of cassette tape equipment. The response at approx. 8,000Hz at 10dB input is improved as much as 14dB. As a result, flatter response is obtained at both low and high input levels.

Overall frequency response (RS-M255X)

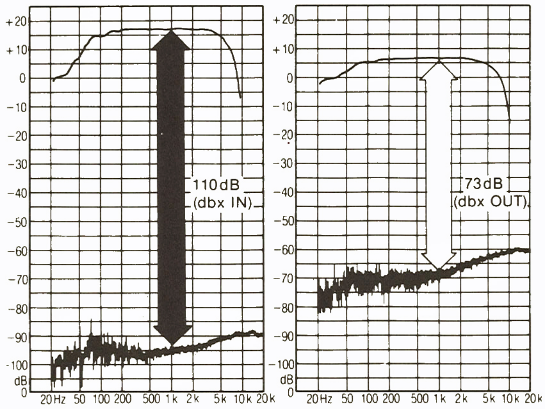


• Remarkable dynamic range of 110dB

About dynamic range:

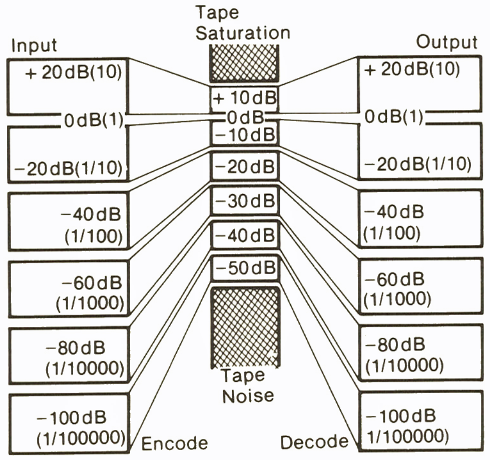
The dynamic range refers to the output range of an audio transmission system, extending from the lowest recognizable level to the highest possible level produced. Dynamic range is one of the values used to express the degree of fidelity of an audio transmission system.

Dynamic range: 1 kHz (RS-M255X)

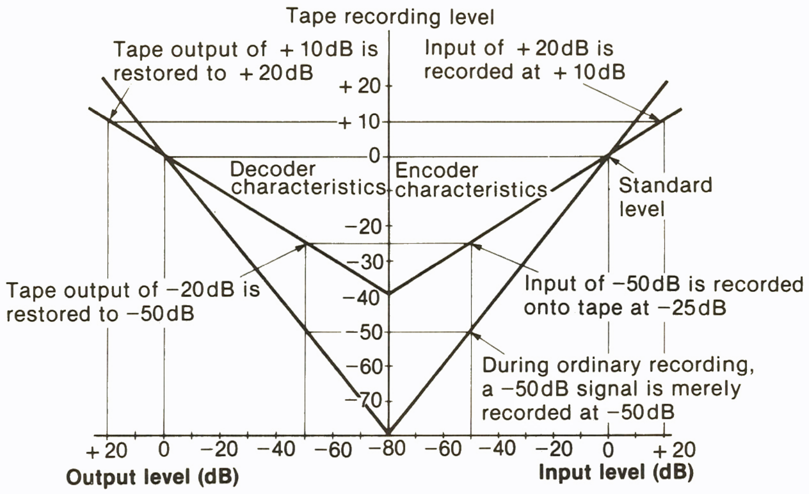


- **Compressing the dynamic range to 1/2 before recording, and then expanding it (by 2x) before playback produces the remarkable dynamic range of the dbx system.**
  - The dynamic range of cassette tape with a saturation level of +10dB and a noise level of −45dB (such as Technics CrO$_2$ position tape) is 55dB. Any sounds with a level greater than +10dB will result in considerable distortion, and any sounds less than −45dB will be inaudible due to the effect of noise, making high-fidelity reproduction impossible.
    The dbx system, however, linearly compresses the input level by a ratio of 1/2 in decibels prior to recording it onto the tape. A +20dB sound is thus compressed to +10dB, a −20dB sound is compressed to −10dB, and a −90dB sound is compressed to −45dB.
    As a result, a signal with a dynamic range extending from −90dB to +20dB (a 110dB dynamic range) can be contained within a range which extends from −45dB to +10dB (a 55dB dynamic range). Recording onto a cassette tape with a 55dB dynamic range is then possible.
    Prior to playback, the exact opposite process occurs and the sound levels are expanded. The +10dB sound is restored to its original level of +20dB, the −10dB sound is restored to −20dB, and the −45dB sound is restored to −90dB.
    Therefore, the basic principle of the dbx system, as described above, is to compress the 110dB dynamic range by 1/2 to 55dB prior to recording, and then the expand it (by 2x) prior to playback.

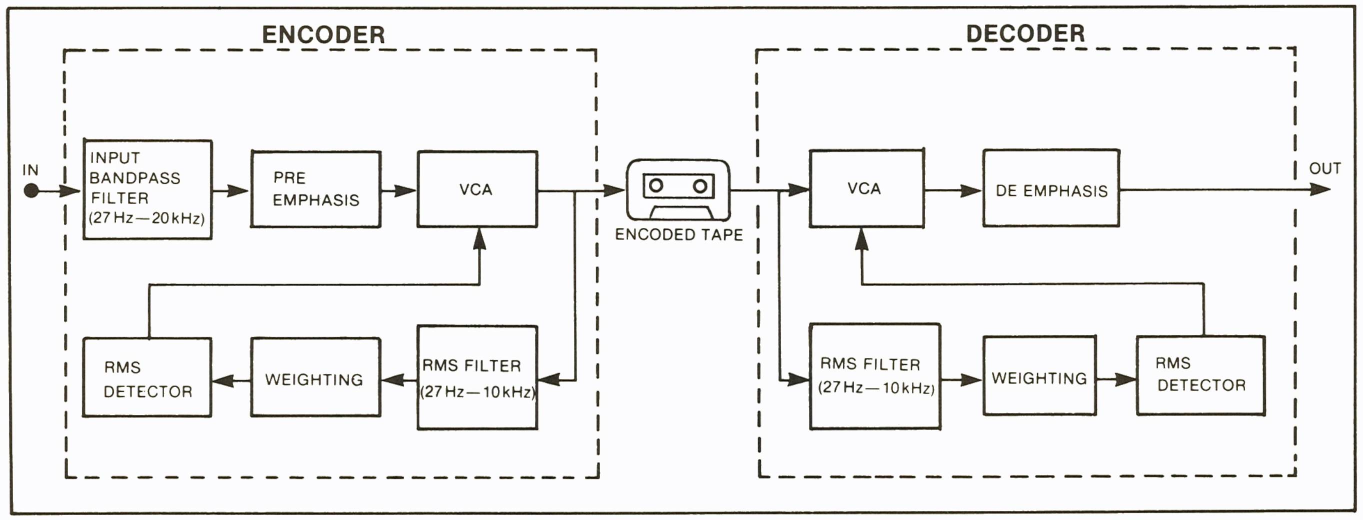
dbx system function diagram



Level compression/expansion diagram



THE BLOCK DIAGRAM OF dbx SYSTEM



(Block configuration change for dbx circuit Encode/Decode is electrically performed by switching transistors between blocks.)

ENCODER

- The portion of the dbx system with compresses the volume level of the input signal by 1/2 (measured in decibels), before seding it to the recording system, is called the encoder.

① INPUT BANDPASS FILTER (27Hz—20kHz)

To prevent pulse noise or other types of interference from causing erroneous operation of the dbx system, all signals outside the 27Hz—20kHz audio band range are eliminated here.

② PRE-EMPHASIS

The high frequency range, where hiss noise is prominent, is emphasized here during recording. The end result is that, although the dbx system is effective in reducing noise across entire frequency band, noise in the high frequency range is reduced still more by this pre-emphasis circuitry.

③ VCA (voltage-controlled amplifier/attenuator)

This is an extremely important circuitry in the construction of the dbx system. In response to the incoming DC control voltage, the VCA varies the degree of amplification logarithmically in the same manner as the direct current, resulting in compression and expansion of the input signal's dynamic range.

④ RMS DETECTOR (RMS: root mean square)

This is an important element in the composition of the dbx system, because its circuitry generates a DC voltage (the voltage that controls the degree of amplification in the VCA) in proportion to the size of the input signal.
It does this by detecting the root mean square value of the input signal, and then converting it to a DC voltage in proportion to the logarithm of the detected level.
Erroneous operation due to phase shift is prevented by monitoring of the voltage level derived from the root mean square value.

⑤ WEIGHTING

To prevent the saturation level of the tape deck in high frequencies, this increases the RMS DETECTOR high frequency sensitivity and decreases the VCA high frequency gain. As a result, the linearity of the tape deck is enhanced in the high frequency range.

⑥ RMS FILTER (27Hz to 10kHz)

This filter cuts any signal other than 27Hz to 10Hz that mixes in input signals to prevent the RMS DETECTOR from malfunctioning. Those to be cut include an FM tuner STEREO PILOT signal, tape deck bias leakage and record player motor rotational noise. In addition, the signal in the frequency range (27Hz to 10kHz) passing through the BAND PASS FILTER is comparatively small in level variations when handled by the tape deck.
This ensures correct complementarity in the operation of the RMS DETECTOR and VCA during Encoding and Decoding.

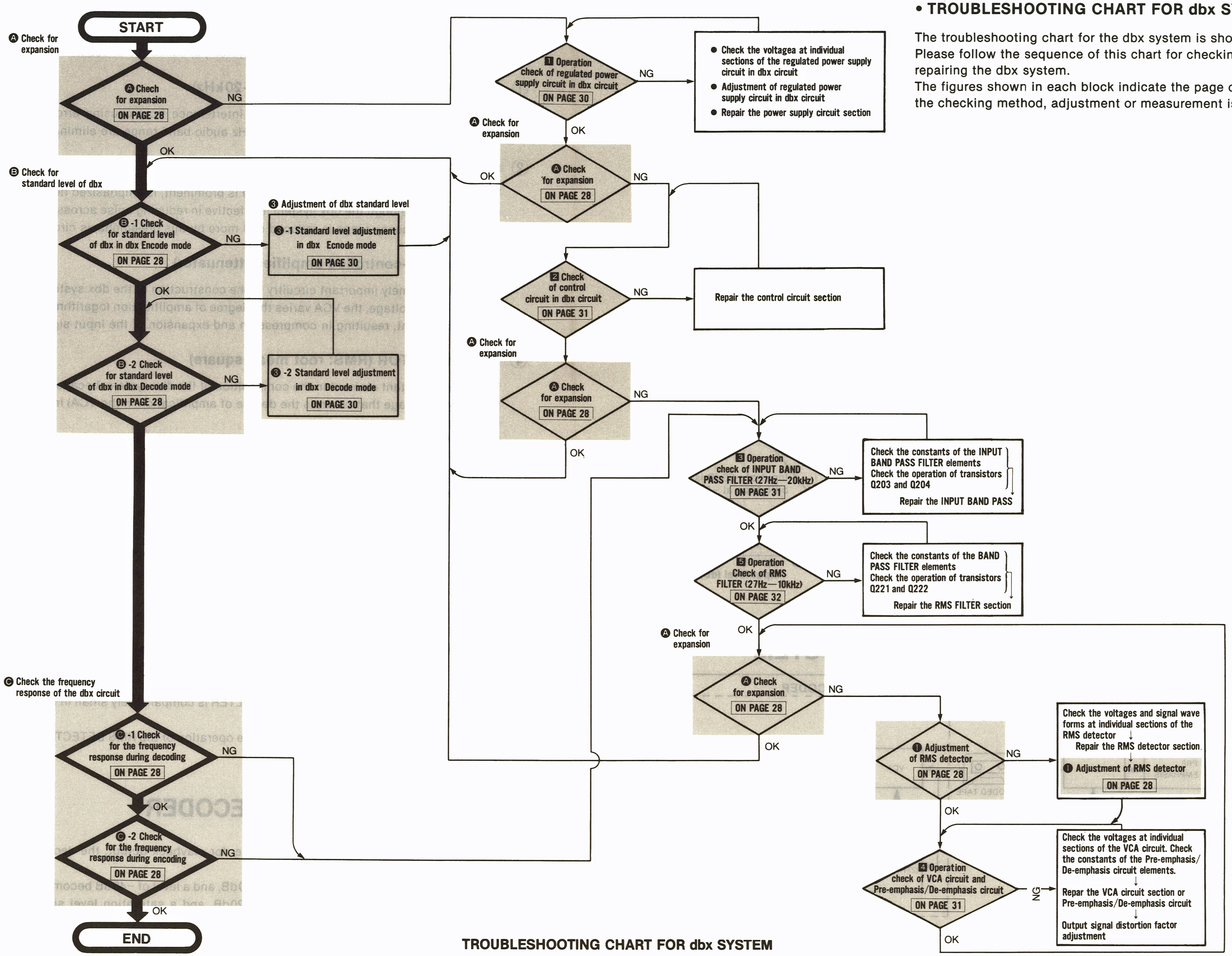
DECODER

As shown in the diagram on the previous page, for playback output, the decoder expands the constantly changing level to double the decibel range.
For example, 2 −30dB signal is expanded to −60dB, and a level of −45dB becomes −90dB. On the other hand, a playback output +10dB is expanded to +20dB, and a saturation level signal is also correspondingly increased.
In terms of the system's operation, the decoder's function is the exact opposite of the function of the previously mentioned encoder.

MEASUREMENT AND ADJUSTMENT METHODS (FOR dbx SYSTEM)

• TROUBLESHOOTING CHART FOR dbx SYSTEM

The troubleshooting chart for the dbx system is shown in Fig. 1. Please follow the sequence of this chart for checking and repairing the dbx system.
The figures shown in each block indicate the page on which the checking method, adjustment or measurement is explamed.


START
Ⓐ Check for expansion
Ⓐ Chech for expansion ON PAGE 28
NG
OK
Ⓑ Check for standard level of dbx
Ⓑ -1 Check for standard level of dbx in dbx Encode mode ON PAGE 28
NG
③ Adjustment of dbx standard level
③ -1 Standard level adjustment in dbx Ecnode mode ON PAGE 30
OK
Ⓑ -2 Check for standard level of dbx in dbx Decode mode ON PAGE 28
NG
③ -2 Standard level adjustment in dbx Decode mode ON PAGE 30
Ⓒ Check the frequency response of the dbx circuit
Ⓒ -1 Check for the frequency response during decoding ON PAGE 28
NG
OK
Ⓒ -2 Check for the frequency response during encoding ON PAGE 28
NG
OK
END
1 Operation check of regulated power supply circuit in dbx circuit ON PAGE 30
NG
● Check the voltagea at individual sections of the regulated power supply circuit in dbx circuit
● Adjustment of regulated power supply circuit in dbx circuit
● Repair the power supply circuit section
OK
Ⓐ Check for expansion
OK
Ⓐ Check for expansion ON PAGE 28
NG
2 Check of control circuit in dbx circuit ON PAGE 31
NG
Repair the control circuit section
Ⓐ Check for expansion
Ⓐ Check for expansion ON PAGE 28
NG
OK
3 Operation check of INPUT BAND PASS FILTER (27Hz—20kHz) ON PAGE 31
NG
Check the constants of the INPUT BAND PASS FILTER elements
Check the operation of transistors Q203 and Q204
Repair the INPUT BAND PASS
OK
5 Operation Check of RMS FILTER (27Hz—10kHz) ON PAGE 32
NG
Check the constants of the BAND PASS FILTER elements
Check the operation of transistors Q221 and Q222
Repair the RMS FILTER section
OK
Ⓐ Check for expansion
Ⓐ Check for expansion ON PAGE 28
NG
OK
❶ Adjustment of RMS detector ON PAGE 28
NG
Check the voltages and signal wave forms at individual sections of the RMS detector
Repair the RMS detector section.
❶ Adjustment of RMS detector ON PAGE 28
OK
4 Operation check of VCA circuit and Pre-emphasis/De-emphasis circuit ON PAGE 31
NG
Check the voltages at individual sections of the VCA circuit. Check the constants of the Pre-emphasis/De-emphasis circuit elements.
Repar the VCA circuit section or Pre-emphasis/De-emphasis circuit
Output signal distortion factor adjustment
OK

TROUBLESHOOTING CHART FOR dbx SYSTEM

Fig. 1

• ADJUSTMENT PARTS LOCATION OF dbx SYSTEM

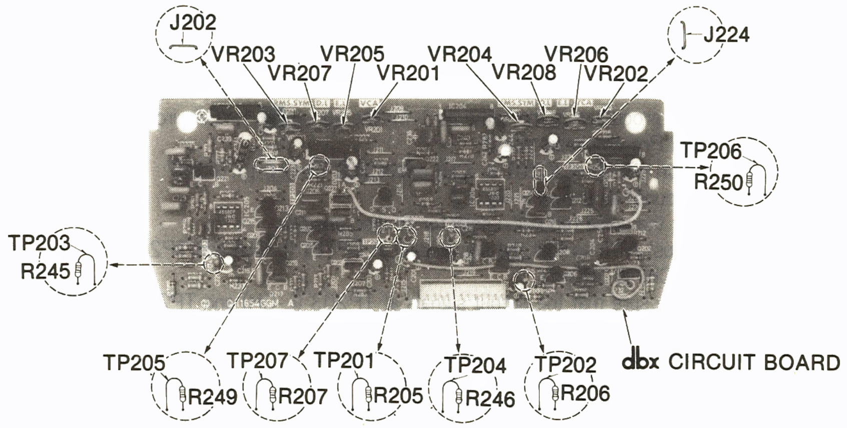
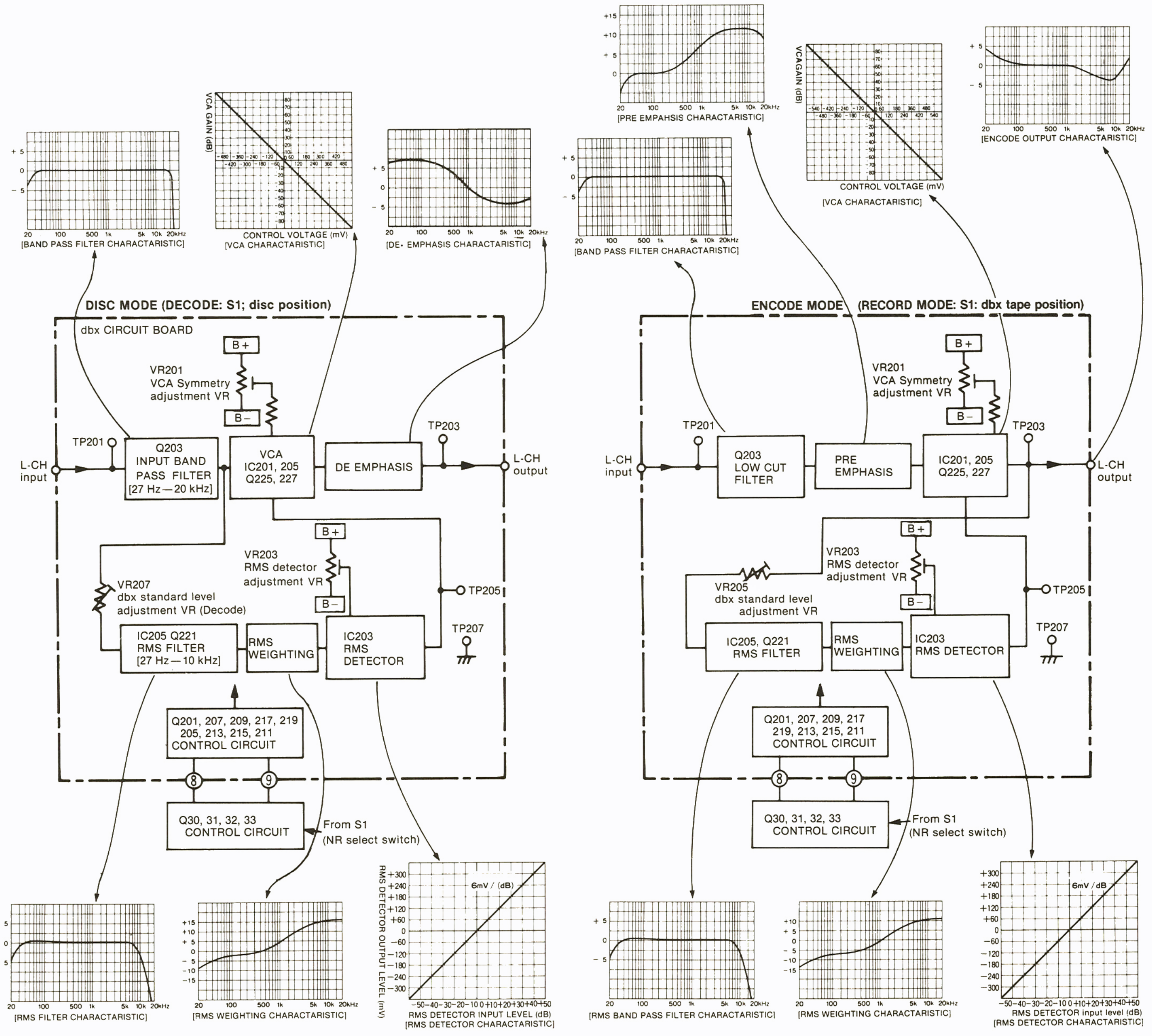

J202
VR203
VR205
VR204
VR206
VR207
VR201
VR208
VR202
J224
TP206
R250
TP203
R245
TP205
R249
TP207
R207
TP201
R205
TP204
R246
TP202
R206
dbx CIRCUIT BOARD

Fig. 2

BLOCK DIAGRAM OF dbx SECTION (L-CH ONLY)


[BAND PASS FILTER CHARACTARISTIC]
CONTROL VOLTAGE (mV)
VCA GAIN (dB)
[VCA CHARACTARISTIC]
[DE- EMPHASIS CHARACTARISTIC]
[PRE EMPHASIS CHARACTARISTIC]
[ENCODE OUTPUT CHARACTARISTIC]
DISC MODE (DECODE: S1; disc position)
dbx CIRCUIT BOARD
B+
B−
VR201
VCA Symmetry
adjustment VR
TP201
L-CH input
Q203
INPUT BAND
PASS FILTER
[27 Hz—20 kHz]
VCA
IC201, 205
Q225, 227
DE EMPHASIS
TP203
L-CH output
VR203
RMS detector
adjustment VR
VR207
dbx standard level
adjustment VR (Decode)
TP205
TP207
IC205 Q221
RMS FILTER
[27 Hz—10 kHz]
RMS WEIGHTING
IC203
RMS DETECTOR
Q201, 207, 209, 217, 219
205, 213, 215, 211
CONTROL CIRCUIT
8
9
Q30, 31, 32, 33
CONTROL CIRCUIT
From S1
(NR select switch)
ENCODE MODE (RECORD MODE: S1: dbx tape position)
Q203
LOW CUT
FILTER
PRE
EMPHASIS
IC201, 205
Q225, 227
VR205
dbx standard level
adjustment VR
IC205, Q221
RMS FILTER
Q201, 207, 209, 217
219, 213, 215, 211
CONTROL CIRCUIT
[RMS FILTER CHARACTARISTIC]
[RMS WEIGHTING CHARACTARISTIC]
RMS DETECTOR OUTPUT LEVEL (mV)
6mV / (dB)
RMS DETECTOR INPUT LEVEL (dB)
[RMS DETECTOR CHARACTARISTIC]
[RMS BAND PASS FILTER CHARACTARISTIC]
6mV / dB
RMS DETECTOR input level (dB)
20 100 500 1k 5k 10k 20kHz

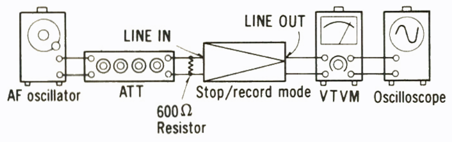
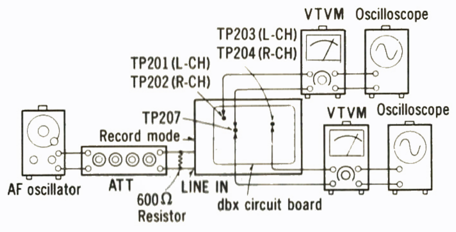
Note: Encode/decode selection of the dbx circuit in RS-M255X is done with a control circuit, composed of transistors. (This control circuit is interlocked with S1 (NR selection switch).)

Fig. 3

dbx SYSTEM CHECKING METHOD

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Input level controls: Maximum
- Output level control: Maximum

<table>
<tr><th>ITEM</th><th>CHECKING METHOD</th></tr>
<tr><td>Ⓐ Check for expansion
Condition:
* Stop mode
* Input level controls … MAX
* Output level control … MAX
* Noise reduction selector … disc/dbx tape
Equipment:
* VTVM * AF oscillator
* ATT * Oscilloscope
* Resistor (600 Ω)</td><td>Ⓐ Check for expansion

LINE IN
LINE OUT
AF oscillator
ATT
600 Ω Resistor
Stop/record mode
VTVM
Oscilloscope
Fig. 4
1. Make the connections as shown in fig. 4 and apply 1 kHz −27 dB signal from LINE IN, and set the noise reduction selector to disc position.
2. Adjust ATT, increase input signal level by 10 dB, and make sure that the reading for VTVM increases by 20 dB ± 1 dB.
3. Adjust ATT, decrease the input signal level, and make sure that the reading for VTVM decreases by 20 dB ± 1 dB.</td></tr>
<tr><td>Ⓑ Check for standard level of dbx
Condition:
* Stop/record mode
* Input level controls … MAX
* Noise reduction selector … disc/dbx tape
Equipment:
* VTVM * AF oscillator
* ATT * Oscilloscope
* Resistor (600 Ω)</td><td>Ⓑ-1 Check for standard level of dbx in dbx Encode mode

VTVM
Oscilloscope
TP203 (L-CH)
TP204 (R-CH)
TP201 (L-CH)
TP202 (R-CH)
TP207
Record mode
VTVM
Oscilloscope
AF oscillator
ATT
600 Ω Resistor
LINE IN
dbx circuit board
Fig. 5
1. Make the connections as shown in fig. 5 and apply 1 kHz −27 dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
3. Make sure that the signal level at TP203 (L-CH) and TP204 (R-CH) is 300 mV ± 0.5 dB.
Ⓑ-2 Check for standard level of dbx in dbx Decode mode
1. Make the connections as shown in fig. 5 and apply 1 kHz −27 dB signal from LINE IN, and check as follows:
2. Set the noise reduction selector to disc position and adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) becomes 300 mV.
3. Make sure that the signal level at TP203 (L-CH) and TP204 (R-CH) is 300 mV ± 0.5 dB.</td></tr>
<tr><td>Ⓒ Check the frequency response of the dbx circuit
Condition:
* Stop/record mode
* Input level controls … MAX
* Noise reduction selector … disc/dbx tape
Equipment:
* VTVM * AF oscillator
* ATT * Oscilloscope
* Resistor (600 Ω)</td><td>Ⓒ-1 Check the frequency response during decoding
1. Make the connections as shown in fig. 5 and apply 1 kHz −27 dB signal from LINE IN, and check as follows:
2. Set the noise reduction selector to disc position, and adjust ATT so that te signal level at TP201 (L-CH) and TP202 (R-CH) becomes 300 mV.
3. With the signal level at TP203 (L-CH) and TP204 (R-CH) as 0 dB, change the signal frequency to 100 Hz, 20 Hz and 7 kHz respectively. Read signal levels at TP203 (L-CH) and TP204 (R-CH) and check that they are within the specifications-1.
Specifications-1
<table>
<tr><th>Frequency</th><th>Signal levels at TP203 and TP204</th></tr>
<tr><td>1 kHz</td><td>0 dB (300 mV)</td></tr>
<tr><td>100 Hz</td><td>−0.5 dB ± 1 dB</td></tr>
<tr><td>20 Hz</td><td>−30 dB ± 5 dB</td></tr>
<tr><td>7 kHz</td><td>+7 dB ± 1 dB</td></tr>
</table>
Ⓒ-2 Check the frequency response during encoding
1. Make the connections as shown in fig. 5 and apply 1 kHz −27 dB signal from LINE IN, and check as follows:
2. Set the noise reduction selector to dbx tape position, and the unit to record mode.
3. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
4. With the signal level at TP203 (L-CH) and TP204 (R-CH) as 0 dB, change the signal frequency to 100 Hz and 7 kHz respectively. Read signal levels at TP203 (L-CH) and TP204 (R-CH) and check that they are within the specifications-2.
Specifications-2
<table>
<tr><th>Frequency</th><th>Signal levels at TP203 and TP204</th></tr>
<tr><td>1 kHz</td><td>0 dB (300 mV)</td></tr>
<tr><td>100 Hz</td><td>+0.5 dB ± 1 dB</td></tr>
<tr><td>7 kHz</td><td>−3.5 dB ± 1 dB</td></tr>
</table>
</td></tr>
</table>

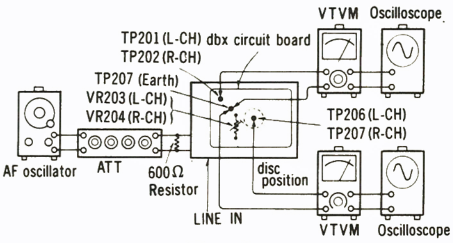
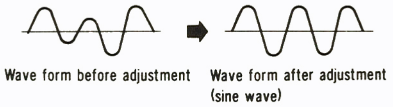
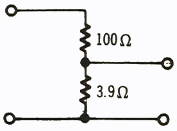
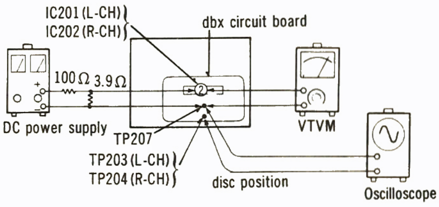
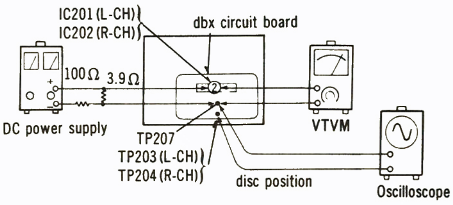
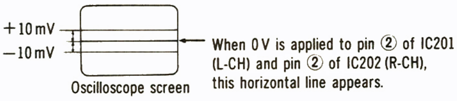
NOTES:

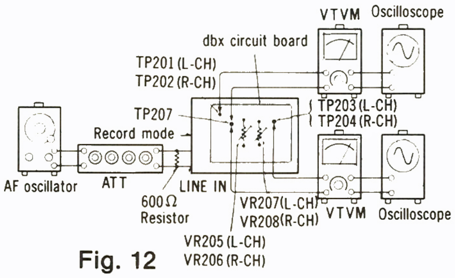
- If the results of the above checks Ⓐ, Ⓑ and Ⓒ do not satisfy the specifications, perform the following adjustments.
- If the specifications are not satisfied even after the adjustments, follow the checking procedure for problems.
- If the output signal is not produced or is extremely distorted, follow the checking procedure for problems.

ADJUSTMENT OF dbx SYSTEM

NOTES: When adjusting the circuit of the dbx system, be sure to perform the adjustments in the following order:
❶ Adjustment of RMS detector, ❷ Adjustment of VCA, ❸ Adjustment of dbx standard level.
Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Input level controls: Maximum

ITEM	ADJUSTMENT
❶ Adjustment of RMS detector Condition: * Stop mode * Input level controls ··· MAX * Noise reduction selector ··· disc Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω)	1. Make the connections as shown in fig. 6, and set the noise reduction selector to disc position. 2. Apply 100 Hz −27 dB signal from LINE IN. 3. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) becomes 300 mV. 4. Make sure that the output signal at TP205 (L-CH) and TP206 (R-CH) is at 200 Hz sine wave. If the output signal is not sinusoidal as shown in fig. 7, adjust VR203 (L-CH) and VR204 (R-CH) to make it sinusoidal. NOTE: The voltage of the output signal after adjustment is about 0.5 mV rms.  VTVM Oscilloscope TP201 (L-CH) TP202 (R-CH) dbx circuit board TP207 (Earth) VR203 (L-CH) VR204 (R-CH) TP206 (L-CH) TP207 (R-CH) AF oscillator ATT 600 Ω Resistor disc position LINE IN VTVM Oscilloscope **Fig. 6**  Wave form before adjustment Wave form after adjustment (sine wave) **Fig. 7**
❷ Adjustment of VCA Condition: * Record/stop mode * Input level controls ··· MAX * Noise reduction selector ··· disc/dbx tape Equipment: * VTVM * Oscilloscope * Resistor (100 Ω, 3.9 Ω)	**Preparation before adjustment** 1. Before adjusting VCA, from the device shown below using resistors of 100 Ω and 3.9 Ω (See fig. 8). 2. Set NR switch to dbx disc. Remove jumpers [J202 (L-CH) and J224 (R-CH)]. 3. Arrange connections referring to wire connection diagram (fig. 9 and 10), since 0 V, +180 mV and −180 mV (DC) are applied in this order to pin 2 of IC201 (L-CH) and pin 2 of IC202 (R-CH).  **Fig. 8**  IC201 (L-CH) IC202 (R-CH) dbx circuit board 100 Ω 3.9 Ω DC power supply TP207 TP203 (L-CH) TP204 (R-CH) VTVM disc position Oscilloscope **Connections when applying +180 mV and 0 V** Adjust DC power supply and arrange connections so that +180 mV or 0 V can be applied to TP203 (L-CH) and TP204 (R-CH). **Fig. 9**  IC201 (L-CH) IC202 (R-CH) dbx circuit board 100 Ω 3.9 Ω DC power supply TP207 TP203 (L-CH) TP204 (R-CH) VTVM disc position Oscilloscope **Connections when applying −180 mV** Adjust DC power supply and arrange connections so that −180 mV can be applied to TP203 (L-CH) and TP204 (R-CH). **Fig. 10** **Adjustment procedure** 1. Apply 0 V to pin ② of IC201 (L-CH) and pin ② of IC202 (R-CH), and a horizontal line will appear on the screen of the oscilloscope. Use this line as the reference line. 2. Apply +180 mV to pin ② of IC201 (L-CH) and pin ② of IC202 (R-CH) (See fig. 9), and check that the level is not more than 10 mV from the reference line. If improper, adjust VR201 (L-CH) and VR202 (R-CH). 3. In the same way, apply −180 mV to pin ② of IC201 (L-CH) and pin ② of IC203 (R-CH) (See fig. 10), and check that the level is not more than 10 mV from the reference line. If improper, adjust VR201 (L-CH) and VR202 (R-CH). 4. Repeat steps 2 and 3, and adjust VRs so that the levels are within ±10 mV when +180 mV and −180 mV are applied (fig. 11). 5. After adjustment, connect jumpers J202 (L-CH) and J224 (R-CH) (See fig. 2).  +10 mV −10 mV Oscilloscope screen When 0 V is applied to pin ② of IC201 (L-CH) and pin ② of IC202 (R-CH), this horizontal line appears. **Fig. 11**
❸ Adjustment of dbx standard level Condition: * Record/stop mode * Input level controls ··· MAX	NOTE: Be sure to perform the standard level adjustment in dbx Encode, followed by the standard level adjustment in dbx Decode.

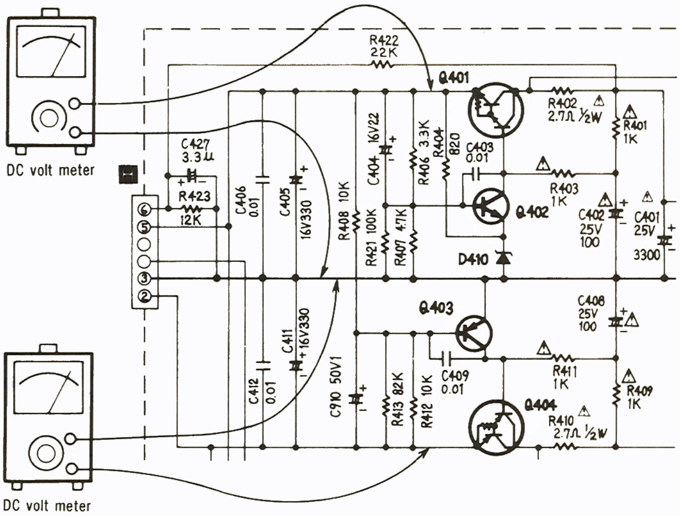
ITEM	ADJUSTMENT
* Noise reduction selector ··· disc/dbx tape Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω)	**❸-1 Standard level adjustment in dbx Encode mode** 1. Make the connection as shown in fig. 12 and apply 1 kHz −27 dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set unit to record mode, adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV. 3. Adjust VR205 (L-CH) and VR206 (R-CH) so that the output signal level at TP203 (L-CH) and TP204 (R-CH) becomes 300 mV±0.5 dB.  VTVM Oscilloscope dbx circuit board TP201 (L-CH) TP202 (R-CH) TP207 Record mode TP203 (L-CH) TP204 (R-CH) AF oscillator ATT LINE IN 600 Ω Resistor VR207 (L-CH) VR208 (R-CH) VTVM Oscilloscope VR205 (L-CH) VR206 (R-CH) Fig. 12 **❸-2 Standard level adjustment in dbx Decode mode** 1. Make the connection as shown in fig. 12 and apply 1 kHz −27 dB signal from LINE IN, and perform the following adjustments. 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) becomes 300 mV. 3. Adjust VR207 (L-CH) and VR208 (R-CH) so that the output signal level at TP203 (L-CH) and TP204 (R-CH) becomes 300 mV±0.5 dB.
NOTES: • After adjustments ❶, ❷ and ❸, re-check according to "dbx SYSTEM CHECKING METHOD". • If the specifications are not satisfied, perform the adjustments again.	

CHECKING PROCEDURE FOR PROBLEMS

NOTES: Find defective parts according to the circuit operation checking method given below, and use the results for your reference during repair. Remember to adjust after repair.

Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Input level controls: Maximum

ITEM	CHECKING METHOD
1 Operation check of regulated power supply circuit in dbx circuit Equipment: * DC volt meter * Oscilloscope	**1-1 Check of +10.5 V voltage** Make the connection as shown in fig. 13 and make sure that the emitter voltage of Q401 is around +10.5 V. **1-2 Check of −10.5 V voltage** Make the connection as shown in fig. 13 and make sure that the emitter voltage of Q404 is around −10.5 V.  DC volt meter 1 R422 22K Q401 R402 2.7Ω ½W R401 1K C427 3.3μ R423 12K C406 0.01 C405 16V330 R408 10K C404 16V22 R421 100K R407 4.7K R406 3.3K R404 820 C403 0.01 R403 1K Q402 C402 25V 100 C401 25V 3300 D410 Q403 C408 25V 100 C412 0.01 C411 16V330 C910 50V1 R413 82K R412 10K C409 0.01 R411 1K R409 1K Q404 R410 2.7Ω ½W DC volt meter Fig. 13

ITEM | CHECKING METHOD

2 Check of control circuit in dbx circuit

Equipment:
- DC volt meter

E.C.B (G.S.D) voltage check of each switching transistor for Encode/Decode

The terminal voltage of each switching transistor in Encode/Decode mode are shown in the table below.

Transistor Ref. No.	Encode (dbx tape)			Decode (dbx tape)			disc		
	E (G)	C (S)	B (D)	E (G)	C (S)	B (D)	E (G)	C (S)	B (D)
Q30	0V	0.015V	0.62V	−0.001V	1.168V	0.017V	0V	0.58V	0.018V
Q31	0V	10.66V	−0.001V	−0.001V	0.006V	0.65V	−0.001V	0.006V	0.65V
Q32	10.78V	−10.62V	10.72V	10.77V	10.75V	10.1V	10.78V	10.74V	10.1V
Q33	−10.72V	5.97V	−10.67V	−10.72V	−10.70V	−10.04V	−10.73V	−10.70V	−10.04V
Q3	0.074V	−0.029V	0V	1.69V	1.64V	0.99V	0.055V	−0.035V	0V
Q11, 12	−10.8V	0V	0V	0.65V	0.04V	0.04V	0.65V	0.04V	0.04V
Q13, 14	0.58V	0V	0V	−10.8V	0.04V	0V	−10.8V	0.04V	0V
Q201, 202	−10.8V	0V	0V	+0.43V	0V	0V	−10.8V	0V	0V
Q205, 206	0V	−1.45V	−10.62V	−1.42V	−1.42V	−0.77V	−1.42V	−1.42V	−0.77V
Q207, 208	−1.45V	−1.45V	−0.83V	0V	−1.42V	−10.7V	0V	−1.42V	−10.71V
Q209, 210	0V	0V	0.61V	−0.15V	0V	−10.7V	0V	0V	−10.7V
Q211, 212	−0.11V	0V	−10.61V	0V	0V	0.63V	0V	0V	0.64V
Q213, 214	0V	−0.1V	−10.56V	0V	−0.1V	−10.56V	−0.29V	−0.29V	0.33V
Q215, 216	−0.1V	−0.1V	0.47V	0V	−0.1V	−10.65V	0V	−0.29V	−10.65V
Q217, 218	0V	0.01V	−10.62V	0V	0V	0.64V	0V	0V	0.64V
Q219, 220	0.01V	0V	0.62V	−1.42V	0V	−10.7V	−1.42V	0V	−10.71V
Q223, 224	−10.75V	−10.54V	−10.61V	−10.72V	10.64V	−10.62V	−10.77V	−10.76V	−10.12V

NOTE:

- If no abnormality is found in steps 1 and 2, check the operation for each part as follows:

3 Operation check of INPUT BAND PASS FILTER circuit (27 Hz−20 kHz)

Condition:
- Record mode
- Input level controls ··· MAX
- Noise reduction selector ··· dbx tape

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

1. Make the connections as shown in fig. 14, and apply 100 Hz −27 dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode.
3. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
4. Make sure that the emitter signal level of Q203 (L-CH) and Q204 (R-CH) is 300 mV.
5. Set the input signal frequency to 5 kHz and make sure that the emitter signal of Q203 (L-CH) and Q204 (R-CH) remains at the same level (300 mV).

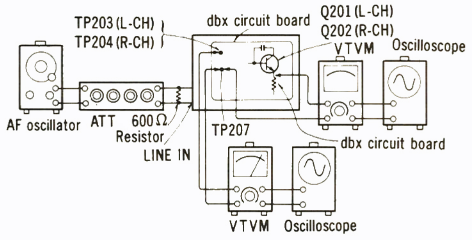

TP203 (L-CH)
TP204 (R-CH)
dbx circuit board
Q201 (L-CH)
Q202 (R-CH)
VTVM
Oscilloscope
AF oscillator
ATT
600Ω
Resistor
LINE IN
TP207
dbx circuit board
VTVM
Oscilloscope

Fig. 14

4 Operation check of VCA circuit and Pre-emphasis/De-emphasis circuit

Condition:
- Stop/record mode
- Input level controls ··· MAX
- Noise reduction selector ··· disc/dbx tape

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

4-1 Operation check of VCA circuit and Pre-emphasis circuit

1. Make the connections as shown in fig. 15, and apply 100 Hz −27 dB signal from LINE IN.
2. Short pin ③ of IC201 (L-CH) and IC202 (R-CH) to TP207 (ground) as shown in fig. 16.
3. Set the unit to record mode, and set the noise reduction selector to dbx tape position.
4. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
5. Make sure that the output signals at TP203 (L-CH) and TP204 (R-CH) are sinusoidal. (The operation of VCA can then be checked.)
6. Shift the frequency of input signal to 5 kHz, and make sure that the output signal levels at TP203 (L-CH) and TP204 (R-CH) are increased by about 12 dB. (The operation of the Pre-emphasis circuit can then be checked.)

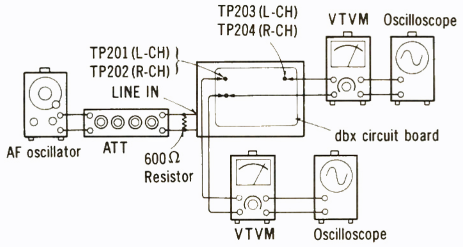

TP203 (L-CH)
TP204 (R-CH)
VTVM
Oscilloscope
TP201 (L-CH)
TP202 (R-CH)
LINE IN
AF oscillator
ATT
600Ω
Resistor
dbx circuit board
VTVM
Oscilloscope

Fig. 15

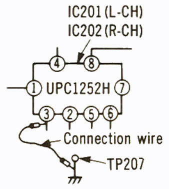

IC201 (L-CH)
IC202 (R-CH)
④
⑧
①
UPC1252H
⑦
③
②
⑤
⑥
Connection wire
TP207

Fig. 16

ITEM | CHECKING METHOD

4-2 Operation check of VCA circuit and De-emphasis circuit

1. The procedure is the same as 1 for the above 4-1 VCA circuit and Pre-emphasis circuit.
2. Short pin ② of IC201 (L-CH) and IC202 (R-CH) to TP207 (ground) as shown in fig. 17.
3. Set the noise reduction selector to disc position.
4. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
5. Make sure that the output signals at TP203 (L-CH) and TP204 (R-CH) are sinusoidal. (The operation of VCA can then be checked.)
6. Change the frequency of input signal to 5 kHz and make sure that the output signal level at TP203 (L-CH) and TP204 (R-CH) is decreased by about 12 dB. (The operation of the De-emphasis circuit can then be checked.)

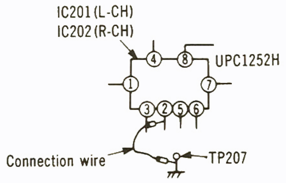

IC201 (L-CH)
IC202 (R-CH)
④
⑧
UPC1252H
①
⑦
③
②
⑤
⑥
Connection wire
TP207

Fig. 17

5 Operation check of RMS FILTER circuit (27 Hz−10 kHz)

Condition:
- Stop mode
- Input level controls ··· MAX
- Noise reduction selector ··· disc

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

1. Make the connections as shown in fig. 18, and apply 100 Hz −27 dB signal from LINE IN.
2. Set the noise reduction selector to disc position.
3. Adjust ATT so that the signal level at TP201 (L-CH) and TP202 (R-CH) is 300 mV.
4. Make sure that the emitter signal level of Q221 (L-CH) and Q222 (R-CH) is around 300 mV.
5. Change the frequency of input signal to 5 kHz and make sure that the emitter signal of Q221 (L-CH) and Q222 (R-CH) remains at the same level (300 mV).

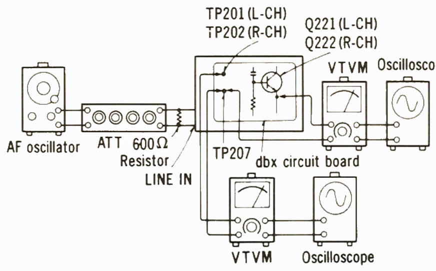
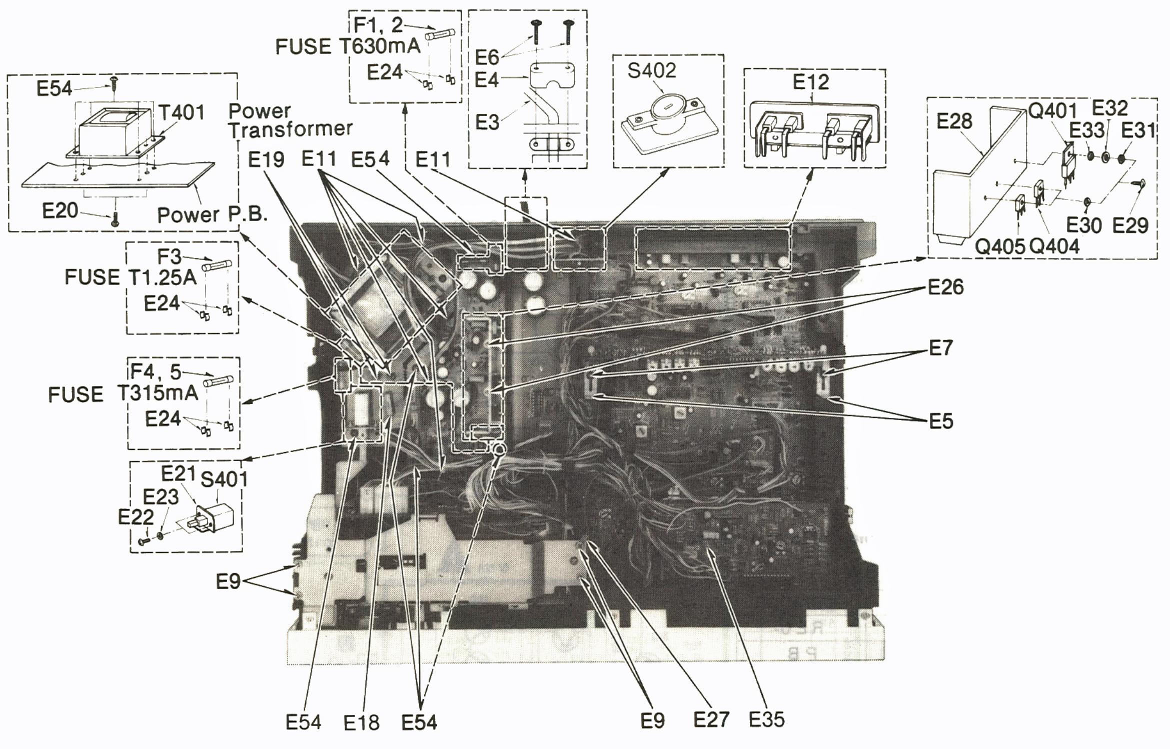
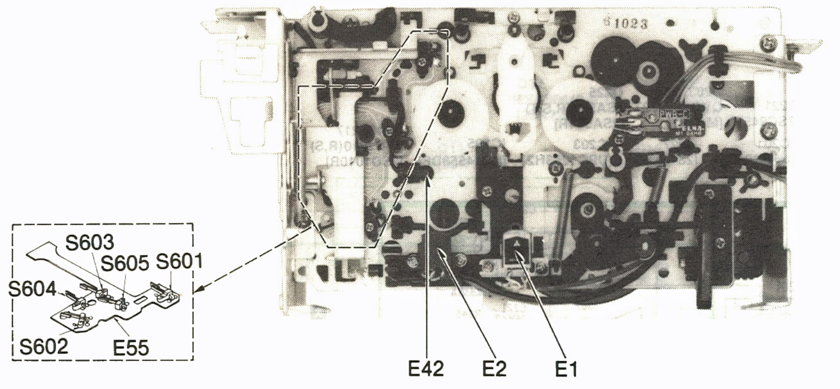
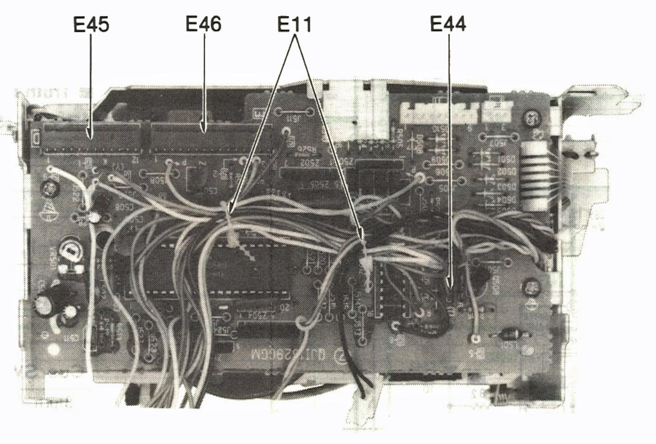

TP201 (L-CH)
TP202 (R-CH)
Q221 (L-CH)
Q222 (R-CH)
VTVM
Oscilloscope
AF oscillator
ATT
600Ω
Resistor
LINE IN
TP207
dbx circuit board
VTVM
Oscilloscope

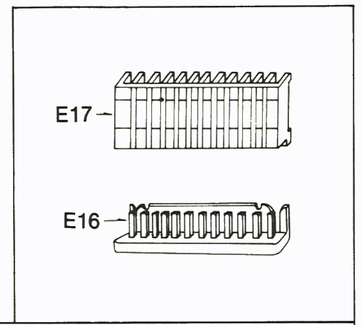
Fig. 18

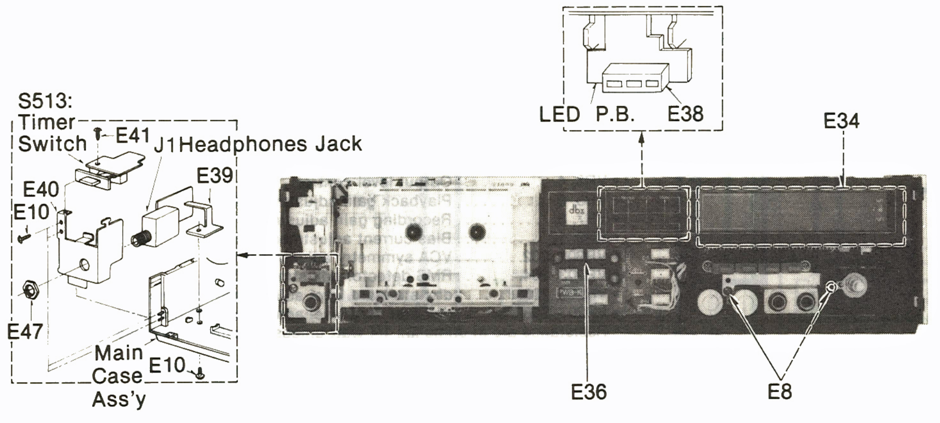
ELECTRICAL PARTS LOCATION

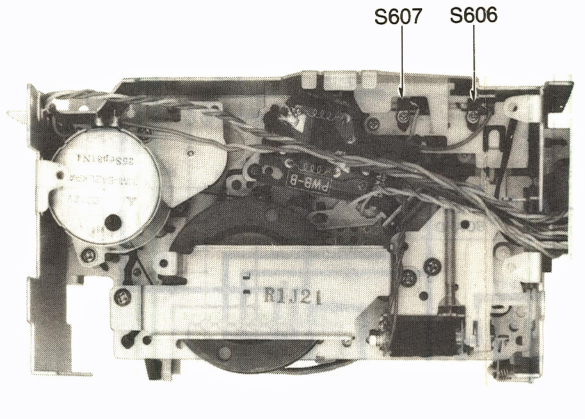

E54
T401
Power
Transformer
F1, 2
FUSE T630mA
E24
E6
E4
E3
S402
E12
E28
Q401
E32
E33
E31
E30
E29
Q405
Q404
E19
E11
E54
E11
E20
Power P.B.
F3
FUSE T1.25A
E24
E26
E7
E5
F4, 5
FUSE T315mA
E24
E21
S401
E23
E22
E9
E54
E18
E54
E9
E27
E35

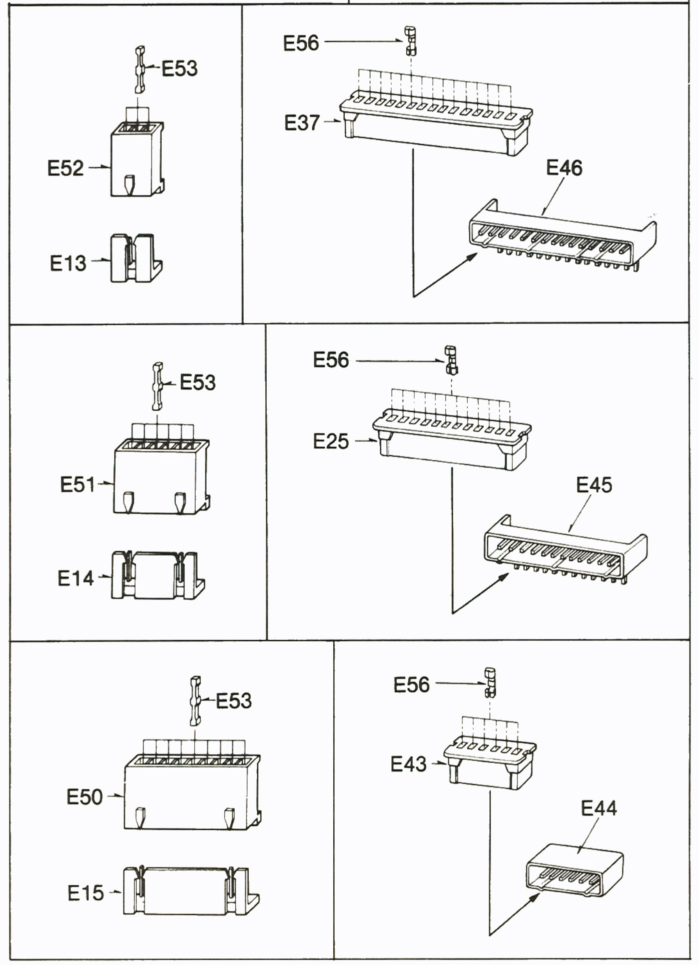

S603
S605
S601
S604
S602
E55
E42
E2
E1

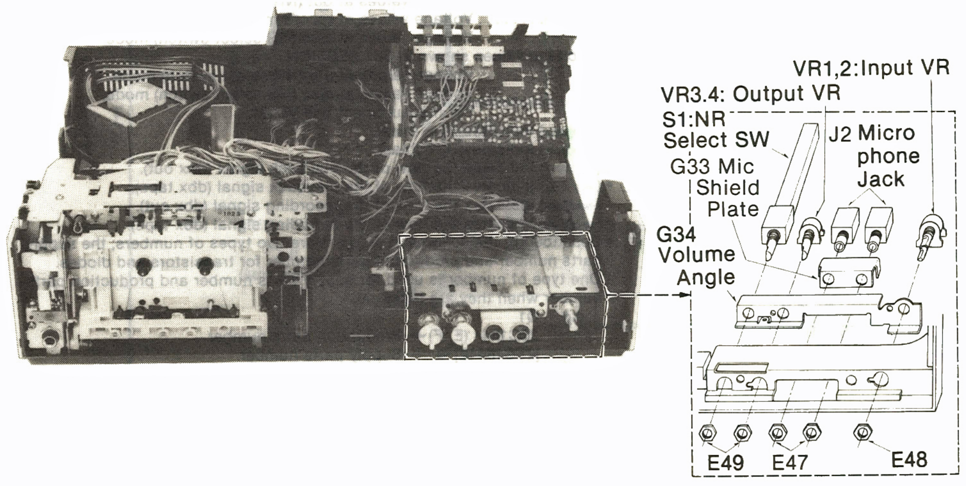

E45
E46
E11
E44

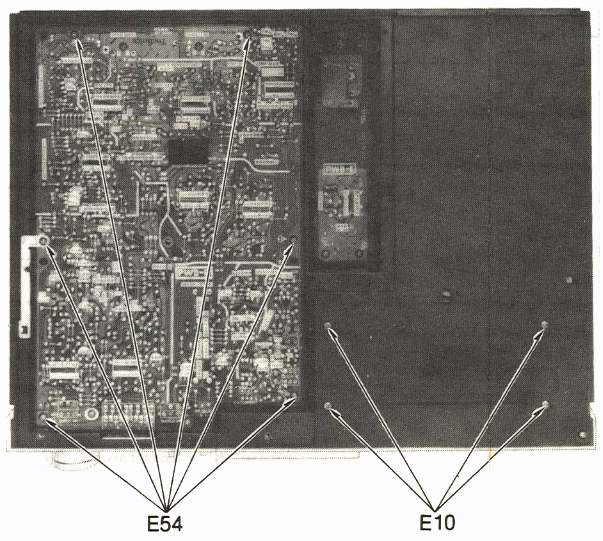



S513:
Timer
Switch
E41
J1 Headphones Jack
E39
E40
E10
E47
Main
Case
Ass'y
E10
LED P.B.
E38
E34
E36
E8




E53
E56
E52
E37
E46
E13
E53
E56
E25
E51
E45
E14
E53
E56
E50
E43
E44
E15


VR1,2:Input VR
VR3.4: Output VR
S1:NR
Select SW
J2 Micro
phone
Jack
G33 Mic
Shield
Plate
G34
Volume
Angle
E49
E47
E48

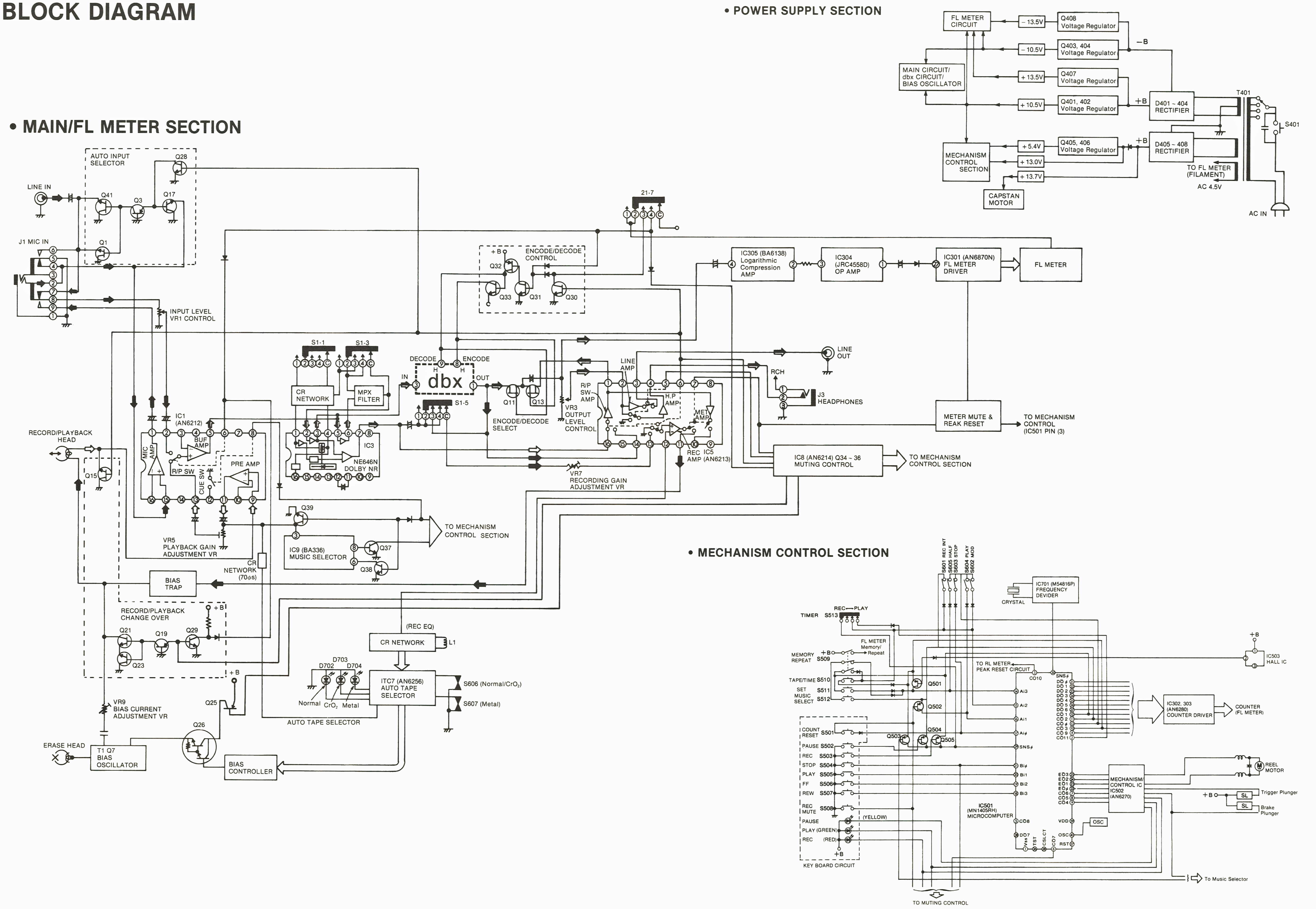


REPLACEMENT PARTS LIST

Important safety notice
Components identified by △ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

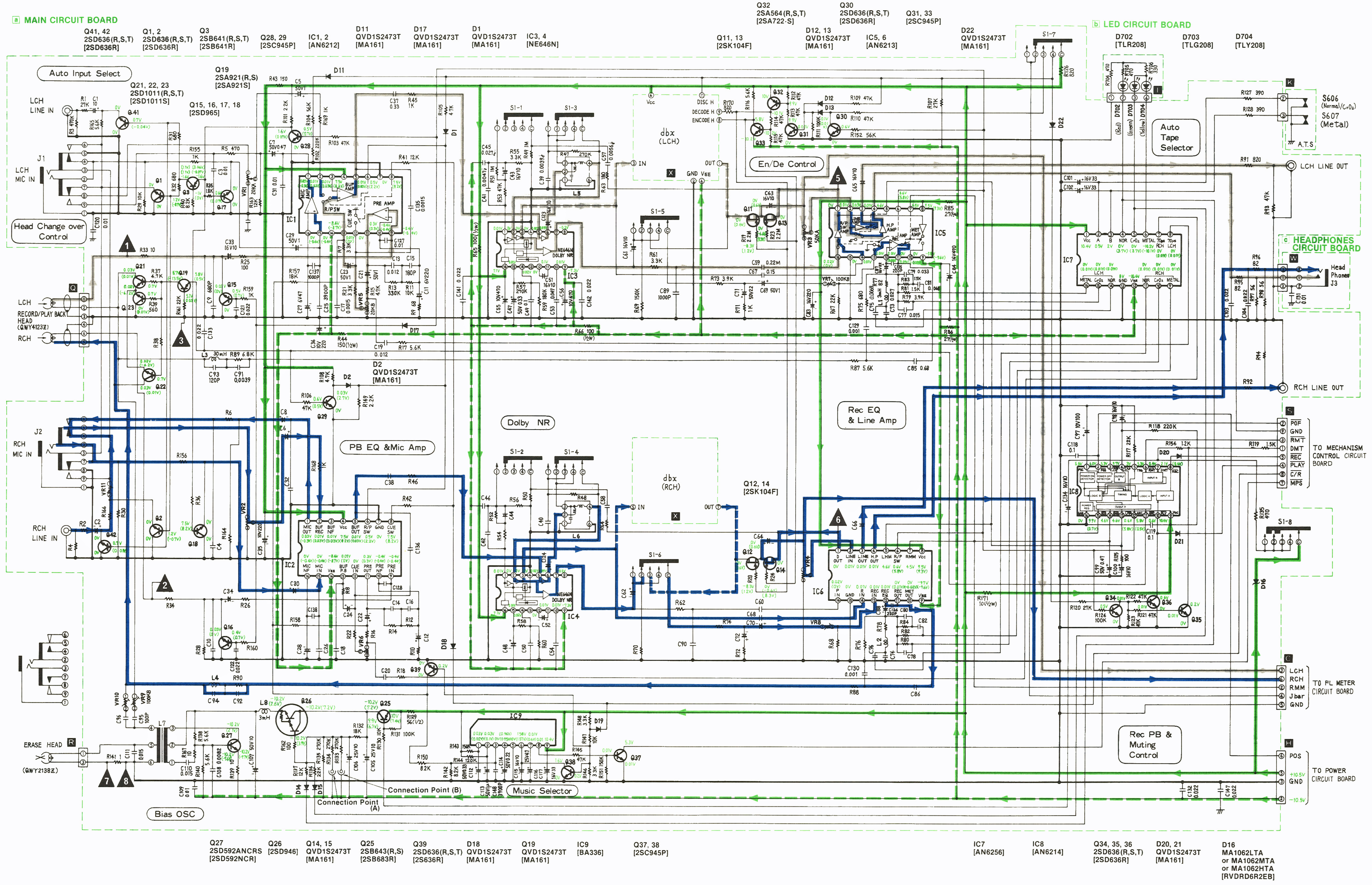
Ref No.	Part No.	Part Name & Description
ELECTRICAL PARTS		
E 1	QWY4123Z	Record/Playback Head
E 2	QWY2138Z	Erase Head
E 3 [D] △	SJA88	AC Power Cord
[For all European areas except United Kingdom.]		
[B] △	QFC1205	AC Power Cord
[For United Kingdom.]		
E 4	QTD1164	Cord Bushing
E 5	QMA4402	dbx P.B. Holder
E 6	XTN3 + 16B	Tapping Screw
E 7	XTN3 + 10B	Tapping Screw
E 8	XTN3 + 8B	Tapping Screw
E 9	XTS3 + 12B	Tapping Screw
E 10	XTB3 + 10BFN	Tapping Screw
E 11	QTD1181	Wire Clamper
E 12	QEJ5003S	Jack Board
E 13	QJP1921TN	3 Pin Post
E 14	QJP1922TN	6 Pin Post
E 15	QJP1923TN	9 Pin Post
E 16	QJP1924TN	12 Pin Post
E 17	QJS1924TNL	12 Pin Socket
E 18 △	QCR0011	Spark Killer
E 19	SJT777	Pin Terminal
E 20	XTN3 + 8B	Tapping Screw
E 21	QMA4364	Switch Angle
E 22	XSN3 + 8S	Screw
E 23	XWA3B	Washer
E 24 △	QTF1054	Fuse Holder
E 25	QJS12001T	12 Pin Socket
E 26	XTN3 + 10B	Tapping Screw
E 27	QJT0015	Lug Terminal
E 28	QTH1164	Heat Sink
E 29	XSN3 + 8S	Screw
E 30	XWA3B	Washer
E 31	XWE3	Washer
E 32	N024B	Insulator Plate
E 33	N018E	Insulator Plate
E 34	QSIFM004F	FL Meter
E 35	QJT1067	Check Pin
E 36	QKJ0520	Led Holder-A
E 37	QJS15001T	15 Pin Socket
E 38	QKJ0521	LED Holder-B
E 39	QJC0050	Earth Plate
E 40	QMA4365	Timer Angle
E 41	XTN3 + 6B	Tapping Screw
E 42	XAMQ44P300	Pilot Lamp
E 43	QJS06001T	6 Pin Socket
E 44	QJP06S001T	6 Pin Post
E 45	QJP12L001T	12 Pin Post (L-type)
E 46	QJP15L001T	15P Post (L-type)
E 47	QNQ1070	Nut
E 48	QNQ1039	Nut
E 49	QNQ1004	Nut
E 50	QJS1923TN	9 Pin Socket
E 51	QJS1922TN	6 Pin Socket
E 52	QJS1921TN	3 Pin Socket
E 53	QJT1054	Contact
E 54	XTN3 + 10BFN	Tapping Screw
E 55	QJi1466RR	Leaf Switch Circuit Board
E 56	QJT1089	Contact

BLOCK DIAGRAM

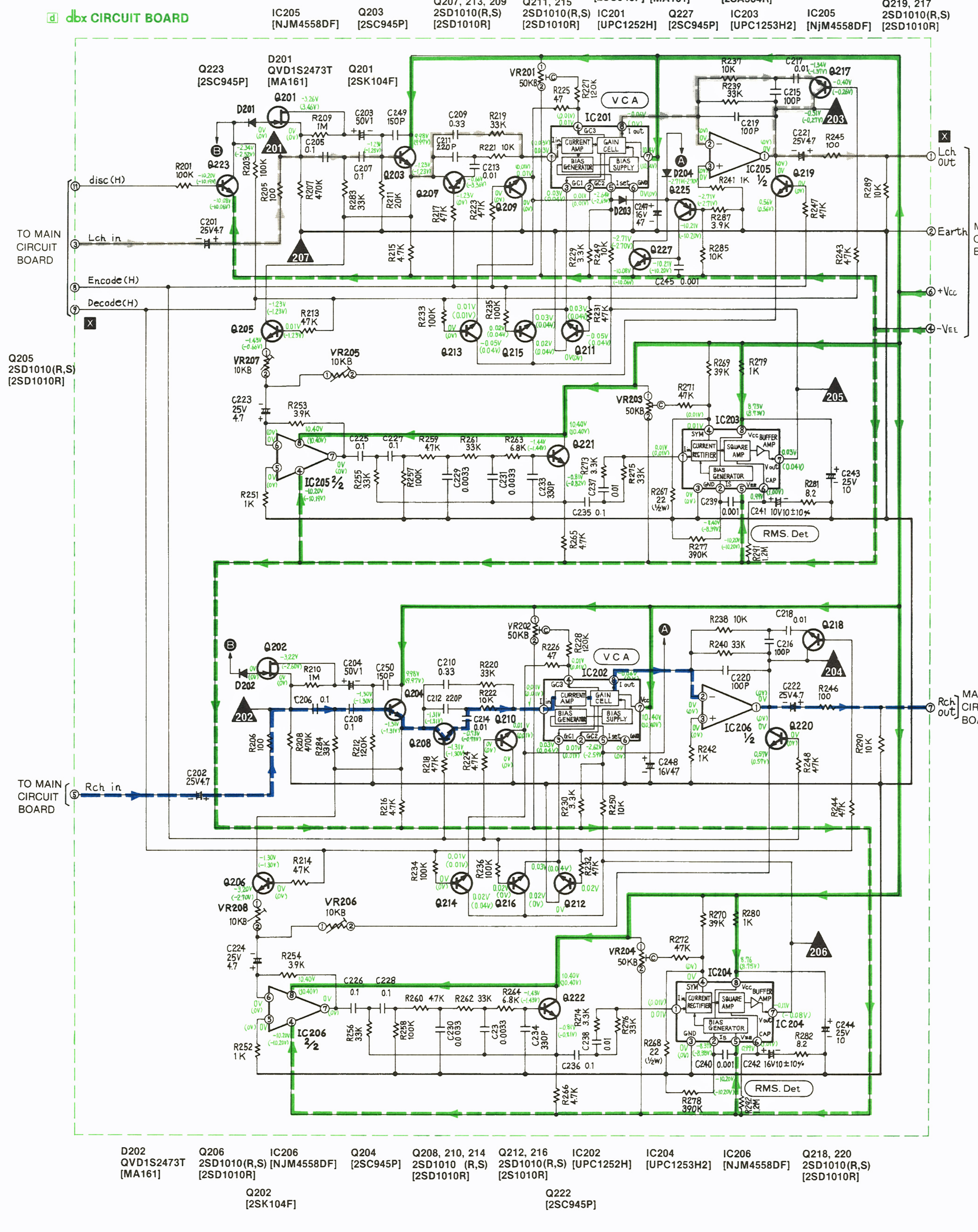


• POWER SUPPLY SECTION
FL METER CIRCUIT
−13.5V
Q408 Voltage Regulator
−B
−10.5V
Q403, 404 Voltage Regulator
MAIN CIRCUIT/ dbx CIRCUIT/ BIAS OSCILLATOR
+13.5V
Q407 Voltage Regulator
+10.5V
Q401, 402 Voltage Regulator
+B
D401 ~ 404 RECTIFIER
T401
S401
MECHANISM CONTROL SECTION
+5.4V
Q405, 406 Voltage Regulator
+13.0V
+13.7V
D405 ~ 408 RECTIFIER
TO FL METER (FILAMENT)
AC 4.5V
CAPSTAN MOTOR
AC IN
• MAIN/FL METER SECTION
AUTO INPUT SELECTOR
Q28
LINE IN
Q41
Q3
Q17
J1 MIC IN
Q1
INPUT LEVEL VR1 CONTROL
21-7
+B
ENCODE/DECODE CONTROL
Q32
Q33
Q31
Q30
IC305 (BA6138) Logarithmic Compression AMP
IC304 (JRC4558D) OP AMP
IC301 (AN6870N) FL METER DRIVER
FL METER
S1-1
S1-3
CR NETWORK
MPX FILTER
DECODE
ENCODE
H
H
IN
dbx
OUT
S1-5
Q11
Q13
ENCODE/DECODE SELECT
VR3 OUTPUT LEVEL CONTROL
LINE AMP
R/P SW AMP
H.P AMP
MET AMP
LINE OUT
RCH
J3 HEADPHONES
REC AMP
IC5 (AN6213)
METER MUTE & REAK RESET
TO MECHANISM CONTROL (IC501 PIN (3)
IC8 (AN6214) Q34 ~ 36 MUTING CONTROL
TO MECHANISM CONTROL SECTION
RECORD/PLAYBACK HEAD
IC1 (AN6212)
MIC AMP
BUF AMP
R/P SW
CUE SW
PRE AMP
IC3
NE646N DOLBY NR
VR7 RECORDING GAIN ADJUSTMENT VR
Q15
Q39
TO MECHANISM CONTROL SECTION
VR5 PLAYBACK GAIN ADJUSTMENT VR
IC9 (BA336) MUSIC SELECTOR
Q37
Q38
CR NETWORK (70ϕs)
BIAS TRAP
RECORD/PLAYBACK CHANGE OVER
+B
Q21
Q19
Q29
Q23
(REC EQ)
CR NETWORK
L1
D703
D702
D704
Normal
CrO₂
Metal
ITC7 (AN6256) AUTO TAPE SELECTOR
S606 (Normal/CrO₂)
S607 (Metal)
AUTO TAPE SELECTOR
VR9 BIAS CURRENT ADJUSTMENT VR
Q25
Q26
ERASE HEAD
T1 Q7 BIAS OSCILLATOR
BIAS CONTROLLER
• MECHANISM CONTROL SECTION
S601 REC INT
S605 HALF
S603 STOP
S604 PLAY
S602 MOD
IC701 (M54816P) FREQUENCY DEVIDER
CRYSTAL
REC ⟷ PLAY
TIMER S513
FL METER Memory/ Repeat
MEMORY REPEAT S509
+B
TAPE/TIME S510
SET S511
MUSIC SELECT S512
Q501
Q502
Q503
Q504
Q505
TO RL METER PEAK RESET CIRCUIT
CO10
Ai3
Ai2
Ai1
Aiϕ
SNSϕ
Biϕ
Bi1
Bi2
Bi3
CO8
DO7
Vss
TST
CSLCT
CO7
IC501 (MN1405RH) MICROCOMPUTER
SNSϕ
DO ϕ
DO 1
DO 2
DO 3
DO 4
DO 5
DO 6
CO 1
CO 2
CO ϕ
CO 3
CO 9
CO11
IC302, 303 (AN6280) COUNTER DRIVER
COUNTER (FL METER)
+B
IC503 HALL IC
COUNT RESET S501
PAUSE S502
REC S503
STOP S504
PLAY S505
FF S506
REW S507
REC MUTE S508
PAUSE (YELLOW)
PLAY (GREEN)
REC (RED)
+B
KEY BOARD CIRCUIT
EO3
EO2
EO1
EOϕ
CO6
CO5
CO4
MECHANISM/ CONTROL IC IC502 (AN6270)
REEL MOTOR
+B
SL
SL
Trigger Plunger
Brake Plunger
VDD
OSC
OSC
RST
To Music Selector
TO MUTING CONTROL

SCHEMATIC DIAGRAM
MAIN SECTION

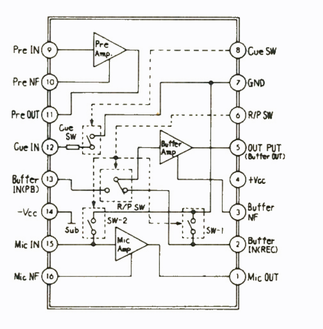

MAIN CIRCUIT BOARD
Auto Input Select
LCH LINE IN
LCH MIC IN
Head Change over Control
LCH RECORD/PLAY BACK HEAD
RCH
RCH MIC IN
RCH LINE IN
PB EQ &Mic Amp
Dolby NR
dbx (LCH)
dbx (RCH)
En/De Control
Rec EQ & Line Amp
LED CIRCUIT BOARD
Auto Tape Selector
S606 (Normal/CrO2)
S607 (Metal)
LCH LINE OUT
RCH LINE OUT
HEADPHONES CIRCUIT BOARD
Head Phones
TO MECHANISM CONTROL CIRCUIT BOARD
TO PL METER CIRCUIT BOARD
TO POWER CIRCUIT BOARD
Rec PB & Muting Control
Music Selector
Connection Point (B)
Connection Point (A)
ERASE HEAD
Bias OSC

dbx SECTION

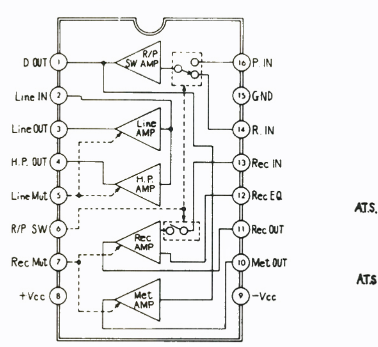

dbx CIRCUIT BOARD
TO MAIN CIRCUIT BOARD
disc (H)
Lch in
Encode (H)
Decode (H)
Rch in
VCA
RMS Det.
MAIN CIRCUIT BOARD
Lch OUT
Rch OUT
Earth
+Vcc
-Vcc

EQUIVALENT CIRCUITS

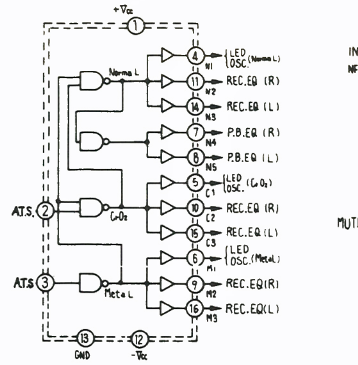
IC1, 2 AN6212


Mic IN
Mic NF
Mic Amp
Sub
SW-2
SW-1
Butter IN(REC)
Mic OUT
NF

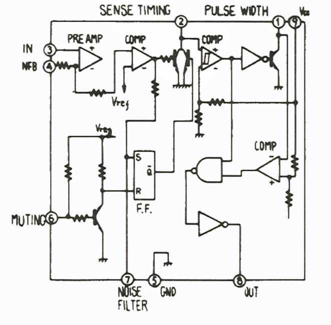
IC5, 6 AN6213


R/P SW
Rec Mut
+Vcc
Rec AMP
Met AMP
Rec OUT
Met OUT
-Vcc

IC7 AN6256


ATS
Metal
GND
-Vcc

IC9 BA336


PULSE WIDTH
SENSE TIMING
PREAMP
COMP
FILTER

■ **Truth table of IC1, 2 (Postive)**

R / P SW

⑥pin	Operation
H	R E C
L	P B

SW-1, SW-2

⑥pin	Operation
H	——
L	Mute

Cue SW

⑧pin	Operation
H	——
L	Cue

■ **Truth table of IC5, 6 (Positive)**

R / P SW

⑥pin	Operation
H	R E C
L	P B

Muting

⑤,⑦Pin	Operation
H	Muting OFF
L	Muting ON

L : GND Level

NOTES:

- S1-1 ~ S1-8 .... NR select switch (shown in OUT position: (1) Dolby NR, (2) OUT, (3) dbx tape, (4) dbx disc)
- S606 .... Auto tape select switch (For Normal/CrO$_2$ tape)
- S607 .... Auto tape select switch (For Metal tape)

Mode	S606	S607
Normal	on	on
CrO$_2$	on	off
Metal	off	off

- VR1, 2. .... Input level controls.
- VR3, 4. .... Output level control.
- VR5, 6. .... Playback gain adjustment VR.
- VR7, 8. .... Recording gain adjustment VR.
- VR9, 10. .... Bias current adjustment VR.
- VR201, 202. .... VCA symmetry adjustment VR.
- VR203, 204. .... RMS detector adjustment VR.
- VR205, 206. .... dbx standard level adjustment VR (Encode).
- VR207, 208. .... dbx standard level adjustment VR (Decode).
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k (Ω)
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ▽ = test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position otherwise specified
  - ○ Voltage values shown in MAIN SECTION.
    NO MARK. . . . Voltage values at out (NR select switch) mode
    ( ). . . . . Voltage values at record mode.
    [ ]. . . . . Voltage values at disc (NR select switch) mode
  - ○ Voltage values shown in dbx SECTION.
    ( ). . . . . Voltage values at out (NR select switch) mode.
    [ ]. . . . . Voltage values at disc (NR select switch) mode.
    For measurement use VTVM.
- (🟩) indicates B + (bias).
- (🟩 - -) indicates B − (bias).
- (▨) indicates the flow of the playback signal (dbx out).
- (▨ - -) indicates the flow of the playback signal (dbx tape).
- (🟦) indicates the flow of the recording signal (dbx out).
- (🟦 - -) indicates the flow of the recording signal (dbx tape).
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q1
  2SC1844 (E, F) ◄ Production parts number
  [2SC1844E] ◄ Supply parts number
  D212
  1S2473T77 ◄ Production parts number.
  [MA161] ◄ Supply parts numbers
- The supply parts number is described alone in the replacement parts list.
- **This schematic diagram may be modified at any time with the development of new technology.**

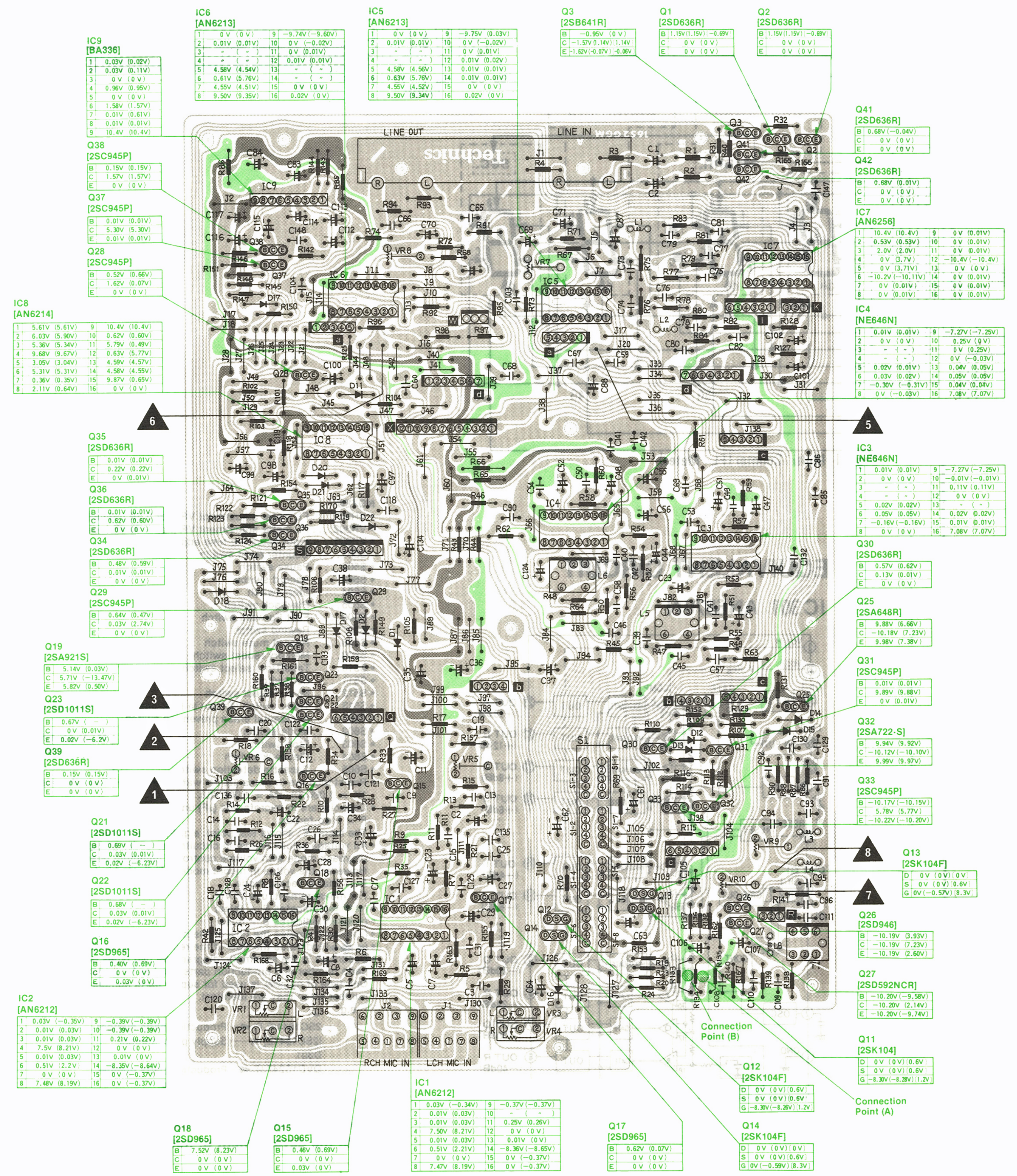
SPECIFICATIONS

* Input level controls ··· MAX
* Output level control ··· MAX

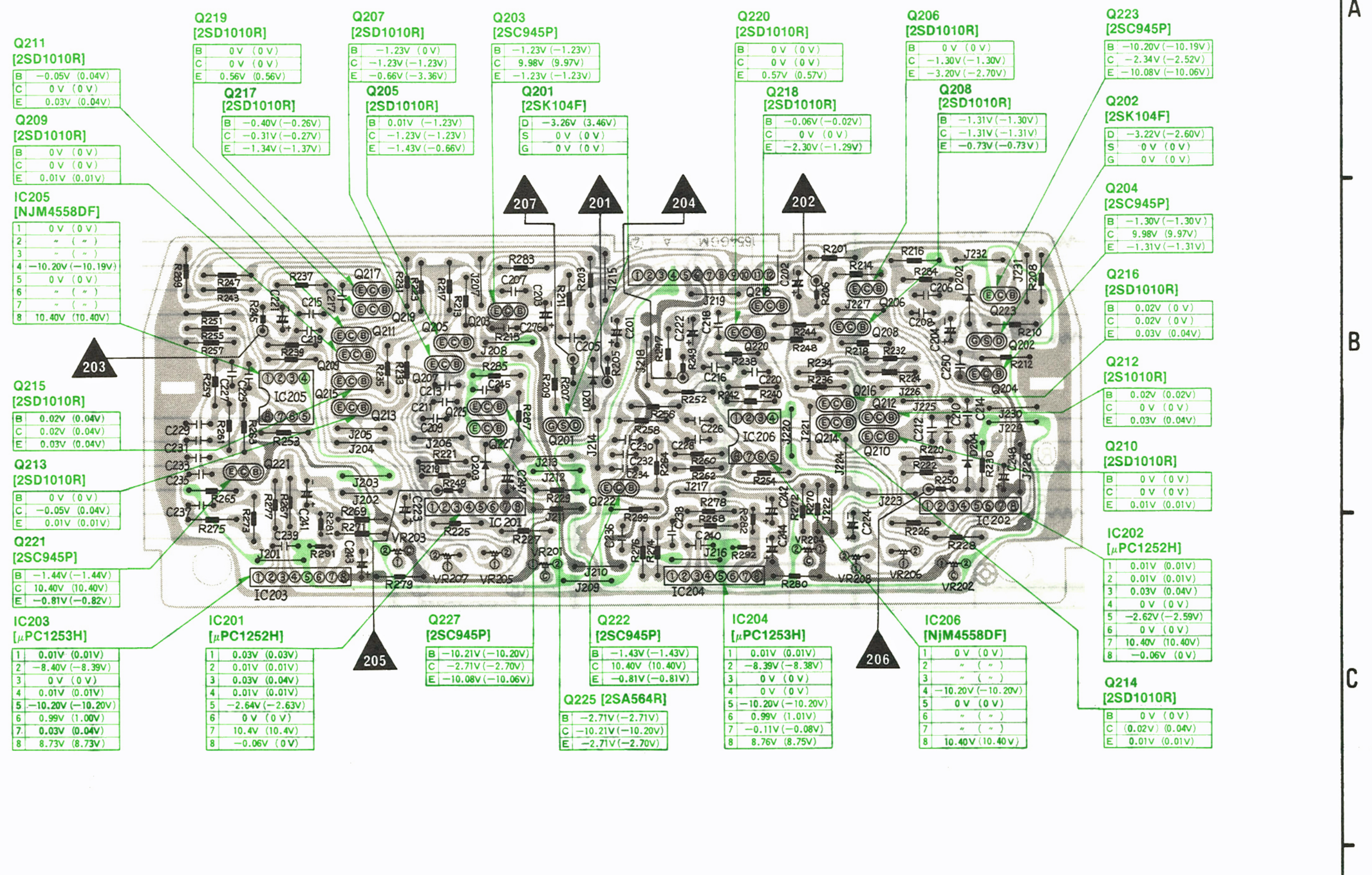
Playback S/N ratio * Test tape ··· QZZCFM	Greater than 45 dB
Overall distortion * Test tape ··· QZZCRA for Normal ··· QZZCRX for CrO$_2$ ··· QZZCRZ for Metal	Less than 4 %
Overall S/N ratio * Test tape ··· QZZCRA	Greater than 43 dB (without NAB filter)

CIRCUIT BOARDS

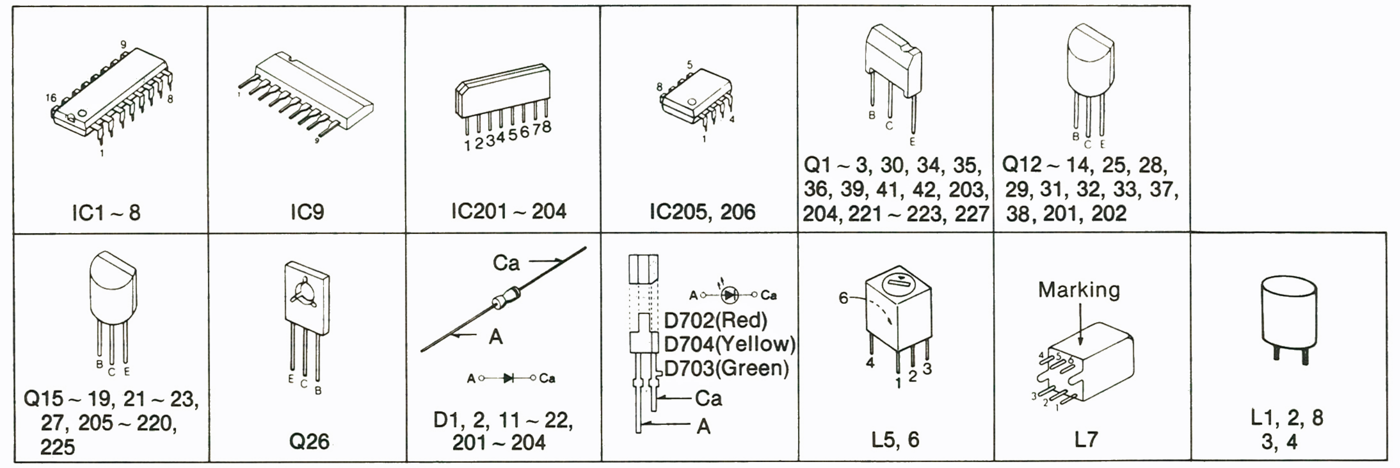
a MAIN CIRCUIT BOARD



d dbx CIRCUIT BOARD



TERMINATIONS


16
9
8
1
IC1 ~ 8
IC9
1 2 3 4 5 6 7 8
IC201 ~ 204
5
4
IC205, 206
B C E
Q1 ~ 3, 30, 34, 35, 36, 39, 41, 42, 203, 204, 221 ~ 223, 227
Q12 ~ 14, 25, 28, 29, 31, 32, 33, 37, 38, 201, 202
Q15 ~ 19, 21 ~ 23, 27, 205 ~ 220, 225
E C B
Q26
Ca
A
D1, 2, 11 ~ 22, 201 ~ 204
D702(Red)
D704(Yellow)
D703(Green)
6
4
1 2 3
L5, 6
Marking
L7
L1, 2, 8
3, 4

NOTES:
- The circuit shown in ▨ on the conductor is B + (bias) circuit.
- The circuit shown in 🟩 on the conductor is B − (bias) circuit.
- Values indicated in ☐ are under no signal condition and playback mode with volume control at minimum position otherwise specified.
  - ○ Voltage values shown in MAIN CIRCUIT BOARD
    NO MARK. . . Voltage values at Out (NR select switch) mode
    ( ). . . . . . . Voltage values at record mode
    [ ]. . . . . . . Voltage values at disc (NR select switch) mode
  - ○ Voltage values shown in dbx CIRCUIT BOARD
    NO MARK. . . Voltage values at dbx tape (NR select switch) mode
    ( ). . . . . . . Voltage values at Out (NR select switch) mode.
    For measurement use VTVM.

- **This circuit board diagram may be modified at any time with the development of new technology.**

NOTES: RESISTORS
ERD. . . Carbon
ERG. . . Metal-oxide
ERS. . . Metal-oxide
ERO. . . Metal-film
ERX. . . Metal-film
ERQ. . . Fuse type metallic
ERC. . . Solid
ERF. . . Cement

CAPACITORS
ECBA . . . . Ceramic
ECG☐ . . . Ceramic
ECK☐ . . . Ceramic
ECC☐ . . . Ceramic
ECF☐. . . . Ceramic
ECQM. . . . Polyester film
ECQE . . . . Polyester film
ECQF . . . . Polypropylene
ECE☐ . . . . Electrolytic
ECE☐N . . . Non polar electrolytic
ECQS. . . . . Polystyrene
ECS☐ . . . . Tantalum
QCS . . . . . . Tantalum

REPLACEMENT PARTS LIST

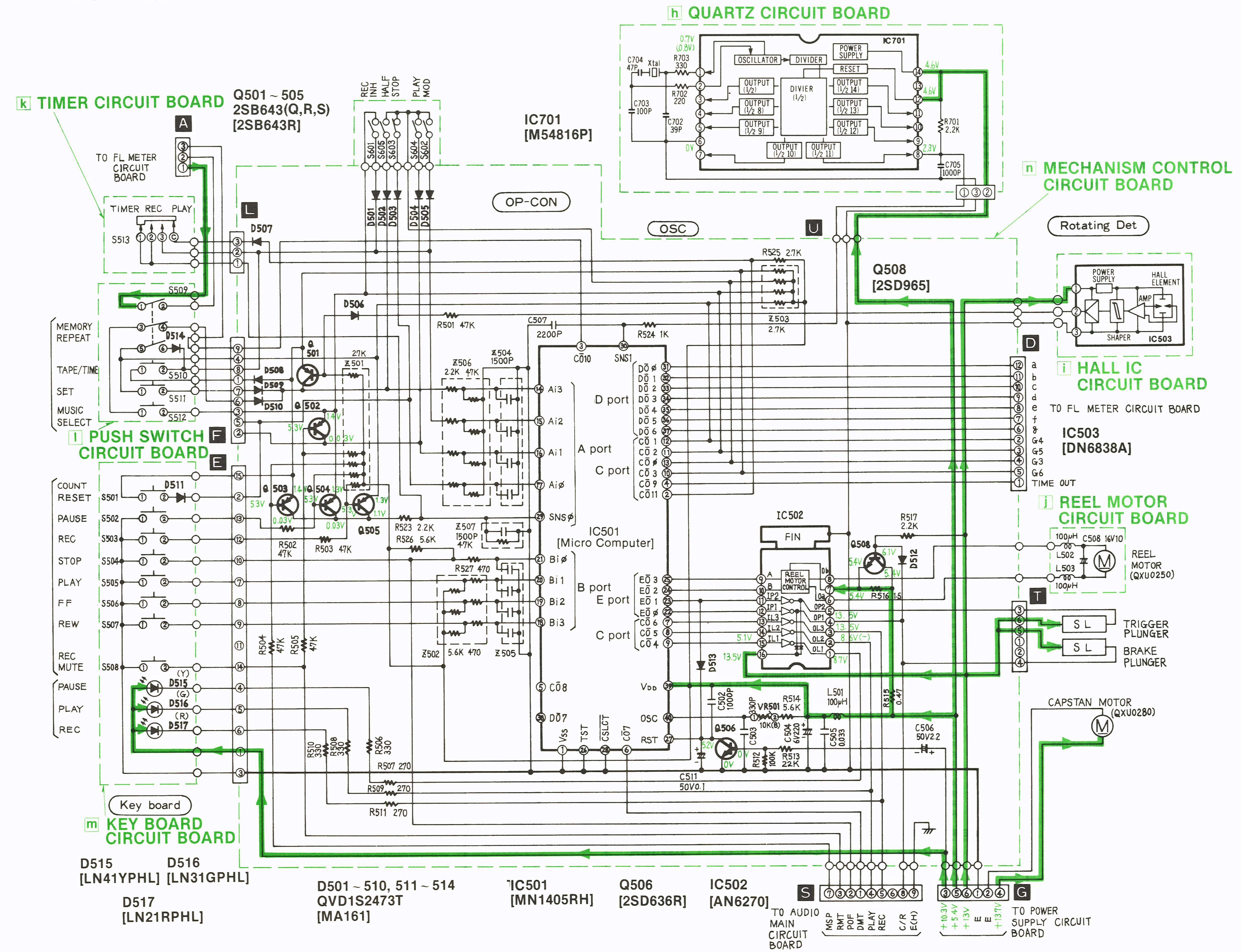
Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref No.	Part No.
RESISTORS	
R 1, 2	ERD25TJ273
R 3, 4	ERD25TJ474
R 5, 6	ERD25FJ471
R 7, 8	ERD25FJ332
R 9, 10	ERD25FJ680
R 11, 12	ERD25FJ103
R 13, 14	ERD25TJ334
R 15, 16	ERD25FJ472
R 17, 18	ERD25FJ562
R 19, 20	ERD25TJ225
R 21, 22	ERD25FJ332
R 23, 24	ERD25TJ225
R 25, 26	ERD25FJ101
R 29, 30	ERD25FJ103
R 31, 32	ERD25FJ681
R 33, 34	ERD25FJ100
R 35, 36	ERD25FJ182
R 37, 38	ERD25FJ472
R 39	ERD25FJ561
R 40	ERD25FJ822
R 41, 42	ERD25TJ123
R 43, 44	ERD50FJ151
R 45, 46	ERD25FJ102
R 47, 48	ERD25TJ274
R 49, 50, 51, 52	ERD25TJ105
R 53, 54	ERD25TJ473
R 55, 56	ERD25FJ332
R 57, 58	ERD25TJ274
R 59, 60	ERD25TJ184
R 61, 62	ERD25FJ332
R 63, 64	ERD25FJ181
R 65, 66	ERD50FJ101
R 67, 68	ERD25TJ223
R 69, 70	ERD25TJ154
R 71, 72	ERD25FJ102
R 73, 74	ERD25FJ392
R 75, 76	ERD25FJ681
R 77, 78	ERD25FJ820
R 79, 80	ERD25FJ392
R 81, 82, 83, 84	ERD25FJ152
R 85, 86	ERQ12HJ270
R 87, 88	ERD25FJ562
R 89, 90	ERD25FJ682
R 91, 92	ERD25FJ821
R 93, 94	ERD25TJ473
R 95, 96	ERD25FJ820
R 97, 98	ERD25FJ560
R 101	ERD25FJ222
R 102	ERD25TJ224
R 103	ERD25TJ473
R 104	ERD25TJ563
R 105	ERD25FJ472
R 106	ERD25TJ473
R 107	ERD25TJ273
R 108	ERD25FJ472
R 109, 110	ERD25TJ473
R 111	ERD25TJ104
R 112, 113, 114, 115	ERD25TJ473
R 116	ERD25FJ562
R 117	ERD25TJ223
R 118	ERD25TJ224
R 119	ERD25FJ152
R 120	ERD25TJ273
R 121, 122, 123	ERD25TJ473
R 124	ERD25TJ104
R 125	ERD25FJ101
R 126	ERD25FJ821
R 127, 128	ERD25FJ391
R 129	ERD50FJ560
R 130	ERD25FJ103
R 131	ERD25TJ104
R 132	ERD25TJ183
R 133, 134, 135	ERD25TJ274
R 136	ERD25TJ223
R 137	ERD25TJ123
R 138	ERD25FJ562
R 139	ERD25FJ100
R 140	ERD25FJ562
R 141	ERD25FJ1R0
R 142	ERD25FJ822
R 143	ERD25TJ154
R 144	ERD25TJ124
R 145	ERD25TJ473
R 146	ERD25FJ332
R 147	ERD25FJ103
R 148	ERD25FJ332
R 149	ERD25FJ222
R 150	ERD25FJ822
R 151	ERD25TJ154
R 152	ERD25TJ563
R 153	ERD25FJ471
R 154	ERD25FJ122
R 155, 156	ERD25FJ102
R 157, 158	ERD25TJ183
R 159, 160	ERD25FJ102
R 161	ERD25TJ223
R 162	ERD25FJ101
R 163, 164	ERD25TJ123
R 165, 166	ERD25FJ562
R 167	ERD25FJ100
R 168, 169	ERD25FJ102
R 170	ERD25FJ821
R 171	ERQ12HJ100
R 201, 203	ERD25TJ104
R 205, 206	ERD25FJ101
R 207	ERD25FJ474
R 208	ERD25TJ474
R 209, 210	ERD25TJ105
R 211, 212	ERD25TJ124
R 213, 214	ERD25TJ473
R 215, 216	ERD25FJ472
R 217, 218	ERD25TJ473
R 219, 220	ERD25TJ333
R 221, 222	ERD25FJ103
R 223, 224	ERD25TJ473
R 225, 226	ERD25FJ470
R 227, 228	ERD25TJ124
R 229, 230	ERD25FJ332
R 231, 232	ERD25TJ473
R 233, 234, 235, 236	ERD25TJ104
R 237, 238	ERD25FJ103
R 239, 240	ERD25TJ333
R 241	ERD25FJ102
R 242	ERD25FJ102
R 243, 244	ERD25TJ473
R 245, 246	ERD25FJ101
R 247, 248	ERD25TJ473
R 249, 250	ERD25FJ103
R 251, 252	ERD25FJ102
R 253, 254	ERD25FJ392
R 255, 256	ERD25TJ333
R 257, 258	ERD25TJ104
R 259, 260	ERD25FJ472
R 261, 262	ERD25TJ333
R 263, 264	ERD25FJ682
R 265, 266	ERD25FJ472
R 267, 268	ERQ12HJ220
R 269, 270	ERD25TJ393
R 271, 272	ERD25TJ473
R 273, 274	ERD25FJ332
R 275, 276	ERD25TJ333
R 277, 278	ERD25TJ394
R 279, 280	ERD25FJ102
R 281, 282	ERD25FJ8R2
R 283, 284	ERD25TJ333
R 285	ERD25FJ103
R 287	ERD25FJ392
R 289, 290	ERD25FJ103
R 291, 292	ERD25TJ125
R 301, 302, 303, 304	ERD25FJ471
R 306, 307	ERD25TJ473
R 309	ERD25TJ223
R 310	ERD25TJ104
R 311	ERD25TJ473
R 312	ERD25FJ183
R 314	ERD25FJ182
R 315	ERD25FJ102
R 316	ERD25FJ103
R 318	ERD25FJ472
R 320	ERD25TJ154
R 321, 322	ERD25TJ683
R 323, 324	ERD25TJ563
R 325, 326	ERD25TJ224
R 327, 328	ERD25FJ222
R 330	ERD25FJ562
R 332	ERD25TJ473
R 333	ERD25TJ104
R 334	ERD25TJ224
R 335	ERD25TJ473
R 336	ERD25FJ332
R 339, 340	ERD25FJ562
R 401 ⚠	ERD25FJ102
R 402 ⚠	ERQ12HJ2R7P
R 403 ⚠	ERD25FJ102
R 404	ERD25FJ471
R 405	ERD25FJ391
R 406	ERD25FJ332
R 407	ERD25FJ472
R 408	ERD25FJ103
R 409 ⚠	ERD25FJ102
R 410 ⚠	ERQ12HJ2R7P
R 411 ⚠	ERD25FJ102
R 412	ERD25FJ103
R 413	ERD25TJ823
R 414 ⚠	ERX2ANJ5R6
R 415 ⚠	ERD25FJ102
R 416	ERD25FJ103
R 417 ⚠	ERD25FJ821
R 418	ERD50FJ331
R 419	ERD25FJ121
R 420	ERD50FJ331
R 421	ERD25TJ104
R 422	ERD25TJ223
R 423	ERD25TJ123
R 424	ERD25FJ560
R 425, 426	ERD50FJ271
R 428	ERD25FJ392
R 429	ERD25FJ562
R 430	ERD25TJ683
R 701	ERD25FJ222
R 702	ERD25FJ221
R 703	ERD25FJ331
R 704, 705	ERD25FJ471
R 706	ERD25FJ331
VARIABLE RESISTORS	
VR 1, 2	EWJ5SAF22A24
VR 3, 4	QWKGTA024A54
VR 5, 6	EVNM4AA00B24
VR 7, 8, 9, 10	EVNM4AA00B15
VR 201, 202, 203, 204	EVNM0AA00B54
VR 205, 206, 207, 208	EVNM0AA00B14
VR 301	EVNM4AA00B24
VR 302	EVNM4AA00B53
VR 501	EVNK4AA00B14
CAPACITORS	
C 1, 2	ECEA1HS100
C 3, 4	ECFDD103KXY
C 5, 6	ECEA50Z1
C 7, 8	ECEA50ZR47
C 9, 10	ECKD1H681KB
C 11, 12	ECEA1AS221
C 13, 14	ECQM1H123JZ
C 15, 16	ECCD1H181K
C 17, 18	ECQM1H152JZ
C 19, 20	ECQM1H123JZ
C 21, 22, 23, 24	ECESA50Z1
C 25, 26	ECKD1H392KB
C 27, 28	ECEA1AS470
C 29, 30	ECEA50M1R
C 31, 32	ECKD1H103ZF
C 33, 34	ECEA16M10R
C 35, 36	ECEA1AS221
C 37, 38	ECQV05334JZ
C 39, 40	ECQM1H392JZ
C 41, 42	ECQM1H472JZ
C 43, 44	ECEA1HS100
C 45, 46	ECQM1H273JZ
C 47, 48	ECEA1HSR33
C 49, 50	ECQM1H104JZ
C 51, 51	ECEA1HS100
C 53, 54	ECFDD473KXY
C 55, 56	ECEA1AS471
C 57, 58	ECQM1H562JZ
C 59, 60	ECQV05224JZ
C 61, 62, 63, 64	ECEA1HS100
C 65, 66	ECEA1EN3R3
C 67, 68	ECQV05154JZ
C 69, 70	ECESA50Z1
C 71, 72	ECEA50Z2R2
C 73, 74	ECQM1H273JZ
C 75, 76	ECQM1H682JZ
C 77, 78	ECQM1H153JZ
C 79, 80	ECQM1H333JZ
C 81, 82	ECQM1H683JZ
C 83	ECEA1CS221
C 84	ECEA1CS471
C 85, 86	ECQV0568JZ
C 87, 88	ECEA1ES220
C 89, 90	ECKD1H102KB
C 91, 92	ECQM1H392JZ
C 93, 94	ECKD2H121K
C 95, 96	ECCD1H101KC
C 97	ECEA1AS101
C 98	ECEA1HS100
C 99	ECEA50ZR47
C 100	ECEA1HS100
C 101, 102	ECEA1CS330
C 103, 104	ECFDD223KXY
C 105, 106	ECEA1HS100
C 107	ECEA1HF100
C 108	ECQM1H822KZ
C 109	ECKD1H103ZF
C 110	ECFDD153KXY
C 111	ECQP1H153JZ
C 112	ECEA1HSR33
C 113	ECESA50Z1
C 114	ECEA50ZR22
C 115	ECEA1HS100
C 116	ECEA25Z4R7
C 117	ECEA1CS330
C 118, 119	ECQM1H104JZ
C 120	ECKD1H103ZF
C 131	ECKD1H103ZF
C 121, 122	ECKD1H223ZF
C 123, 124	ECEA1HS100
C 125, 126	ECCD1H221K
C 127, 128	ECKD1H103ZF
C 129, 130	ECKD1H102KB
C 132, 133	ECKD1H223ZF
C 135, 136	ECQM1H152JZ
C 141, 142, 147	ECKD1H223ZF
C 148	ECKD1H392KB
C 201, 202	ECEA25Z4R7
C 203, 204	ECEA50Z1
C 205, 206, 207, 208	ECQV05104JZ
C 209, 210	ECQV05334JZ
C 212	ECCD1H221K
C 213, 214	ECQM1H103JZ
C 215	ECCD1H103JZ
C 216	ECCD1H101KC
C 217, 218	ECQM1H103JZ
C 219, 220	ECCD1H101KC
C 221	ECEA25Z4R7
C 221	ECCD1H221K
C 222, 223, 224	ECEA25Z4R7
C 225, 226, 227, 228	ECQV05104JZ
C 229, 230, 231, 232	ECQM1H332JZ
C 233, 234	ECCD1H331K
C 235, 236	ECQV05104JZ
C 237, 238	ECQM1H103JZ
C 239, 240	ECQM1H102JZ
C 241, 242	ECEA16M10R
C 243, 244	ECEA1HS100
C 245	ECQM1H102JZ
C 247, 248	ECEA1ES470
C 249, 250	ECCD1H151KC
C 301	ECFD104KXY
C 302	ECFDD223KXY
C 303, 304	ECEA50Z1
C 305, 306	ECEA50ZR47
C 307, 308	ECEA1HS100
C 309	ECEA1ES101
C 310	ECFDD473KXY
C 311	ECKD1H682MD
C 401 ⚠	ECEA1ES332
C 402 ⚠	ECEA1ES101
C 403	ECKD1H103ZF
C 404	ECEA1ES220
C 405	ECEA1CS331
C 406	ECKD1H103ZF
C 407 ⚠	ECEA1ES222
C 408 ⚠	ECEA1ES101
C 409	ECKD1H103ZF
C 410	ECEA50Z1
C 411	ECEA1CS331
C 412	ECKD1H103ZF
C 413	ECQP1103JZ
C 414 ⚠	ECEA1CS471
C 415, 416 ⚠	ECEA1CS472
C 417, 418 ⚠	ECEA1HS100
C 419	ECKD1H103ZF
C 420	ECQP1103JZ
C 421	ECEA1ES470
C 422	ECEA1ES220
C 423	ECEA1ES470
C 424	ECEA1ES220
C 425, 426	ECFDD104KZY
C 427	ECEA50Z3R3
C 428, 430	ECFDD104KZY
C 431 ⚠	ECEA1CS472
C 502	ECKD1H102MD
C 503	ECCD1H331K
C 504	ECEA1AS221
C 505	ECKD1H332ZF
C 506	ECEA50ZR2R2
C 507	ECKD1H222MD
C 508	ECEA1CN100
C 511	ECEA50ZR1
C 702	ECCD1H390KC
C 703	ECCD1H101KC
C 704	ECCD1H470KC
C 705	ECKD1H102KB
COMBINATION PARTS	
Z 501	EXBEQ5273K
Z 502	EXBD86181K
Z 503	EXBEQ4272K
Z 504	QCRFWA1
Z 505	EXFP4472Z
Z 506	EXBD8825K
Z 507	EXRP152K473
TRANSISTORS	
Q 1, 2	2SD636R
Q 3	2SB641R
Q 11, 12, 13, 14	2SK104F
Q 15, 16	2SD965
Q 17, 18	2SD965
Q 19	2SA921S
Q 21, 22, 23	2SD1011S
Q 25	2SA683R
Q 26	2SD946
Q 27	2SD592NCR
Q 28, 29	2SC945P
Q 30	2SD636R
Q 31	2SC945P
Q 32	2SA722-S
Q 33	2SC945P
Q 34, 35, 36	2SD636R
Q 37, 38	2SC945P
Q 39, 41, 42	2SD636R
Q 201, 202	2SK104F
Q 203, 204	2SC945P
Q 205	2SD1010R
Q 206, 207, 208, 209, 210, 211, 212, 213, 214 215, 216, 217, 218, 219, 220	2SD1010R
Q 221, 222, 223	2SC945P
Q 225	2SA564R
Q 227	2SC945P
Q 301, 302	2SD636R
Q 303	2SB641R
Q 304	2SA564R
Q 401	2SD836Q
Q 402	2SC945P
Q 403	2SA564R
Q 404	2SB895R
Q 405	2SD946
Q 406	2SC945P
Q 407	2SD592NCR
Q 408	2SA683R
Q 501, 502, 503, 504, 505	2SB643R
Q 506	2SD636R
Q 508	2SD965
DIODES & RECTIFIERS	
D 1, 2, 11, 12, 13, 14, 15	MA161
D 16	RVDRD6R2EB
D 17, 18, 19, 20, 21, 22, 201, 202, 203, 204, 301, 302, 303, 305, 306	MA161
D 401, 402, 403, 404, 405, 406, 407, 408, 409	SM112
D 410, 411	MA1056
D 412, 413	MA161
D 414, 415	MA1150A
D 416	MA1033LLF
D 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514	MA161
D 515	LN41YPHL
D 516	LN31GPHL
D 517	LN21RPHL
D 702	TLR208
D 703	TLG208
D 704	TLY208
INTEGRATED CIRCUITS	
IC 1	AN6212
IC 2	MA6212
IC 3, 4	NE646N
IC 5, 6	AN6213
IC 7	AN6256
IC 8	AN6214
IC 9	BA336
IC 201, 202	UPC1252H
IC 203, 204	UPC1253H2
IC 205, 206	NJM4558DF
IC 301	AN6870N
IC 302, 303	AN6280
IC 304	NJM4556D
IC 305	BA6138
IC 501	MN1405RH
IC 502	AN6270
IC 503	DN6838A
IC 701	M54816P

Ref No.	Part No.	Part Name & Description
	RESONATOR	
X 701	QZE0049	Crystal
	COILS	
L 1, 2	QLQX0332KWA	Peaking Coil
L 3, 4	QLQX0343KWA	Bias Trap Coil
L 5, 6	QLM9Z9K	MPX Filter
L 7	QLB0198KA	Bias Oscillation Coil
L 8	QLQX0332KWA	Peaking Coil
L 501	ELEH101KA	Choke Coil
L 502, 503	QLQZ1014D	Choke Coil
	TRANSFORMER	
T 401	⚠ QLPD66EMX	AC Power Transformer
	FUSES	
F 1, 2	⚠ XBAQ0008	Fuse (T630mA)
F 3	⚠ XBAQ125028	Fuse (T1.25A)
F 4, 5	⚠ XBAQ0006	Fuse (T315mA)
	SWITCHES	
S 1	QSR8402	Rotary Switch (NR Selector)
S 401	⚠ QSW1117AS	Push Switch (Power ON/OFF)
S 402	⚠ QSR1407	Rotary Switch (Voltage Selector)
S 501, 502, 503, 504, 505, 506, 507, 508	QSW1118HA	Key Board Switch
S 509, 510, 511, 512	QSWY409	Push Switch
S 513	QSS1303	Slide Switch (Timer Switch)
S 601	QSB0260	Leaf Switch (Erase Safety Switch)
S 602	QSB0260	Leaf Switch (Mode Sensing Switch)
S 603	QSB0261	Leaf Switch (Stop Switch)
S 604	QSB0260	Leaf Switch (Playback Switch)
S 605	QSB0261	Leaf Switch (Half Detection Switch)
S 606, 607	QSB0266	Leaf Switch (Auto Tape Selector)
	JACKS	
J 1	QJA0259	Headphones Jack
J 2	QJA0262	Microphone Jack

SCHEMATIC DIAGRAM

MECHANISM CONTROL SECTION


h QUARTZ CIRCUIT BOARD
IC701
OSCILLATOR
DIVIDER
POWER SUPPLY
RESET
OUTPUT
k TIMER CIRCUIT BOARD
Q501 ~ 505
2SB643(Q,R,S)
[2SB643R]
IC701
[M54816P]
n MECHANISM CONTROL CIRCUIT BOARD
TO FL METER CIRCUIT BOARD
TIMER REC PLAY
S513
OP-CON
OSC
Rotating Det
Q508
[2SD965]
MEMORY REPEAT
TAPE/TIME SET
MUSIC SELECT
D506
D507
D508
D509
D510
D514
S509
S510
S511
S512
i HALL IC CIRCUIT BOARD
TO FL METER CIRCUIT BOARD
IC503
[DN6838A]
HALL ELEMENT
POWER SUPPLY
AMP
SHAPER
l PUSH SWITCH CIRCUIT BOARD
D port
A port
C port
B port
E port
IC501
[Micro Computer]
TIME OUT
j REEL MOTOR CIRCUIT BOARD
REEL MOTOR (QXU0250)
COUNT RESET
PAUSE
REC
STOP
PLAY
FF
REW
REC MUTE
S501
S502
S503
S504
S505
S506
S507
S508
IC502
FIN
TRIGGER PLUNGER
BRAKE PLUNGER
CAPSTAN MOTOR (QXU0280)
PAUSE
PLAY
REC
D515
D516
D517
Key board
m KEY BOARD CIRCUIT BOARD
TO AUDIO MAIN CIRCUIT BOARD
TO POWER SUPPLY CIRCUIT BOARD

D515 D516
[LN41YPHL] [LN31GPHL]

D517
[LN21RPHL]

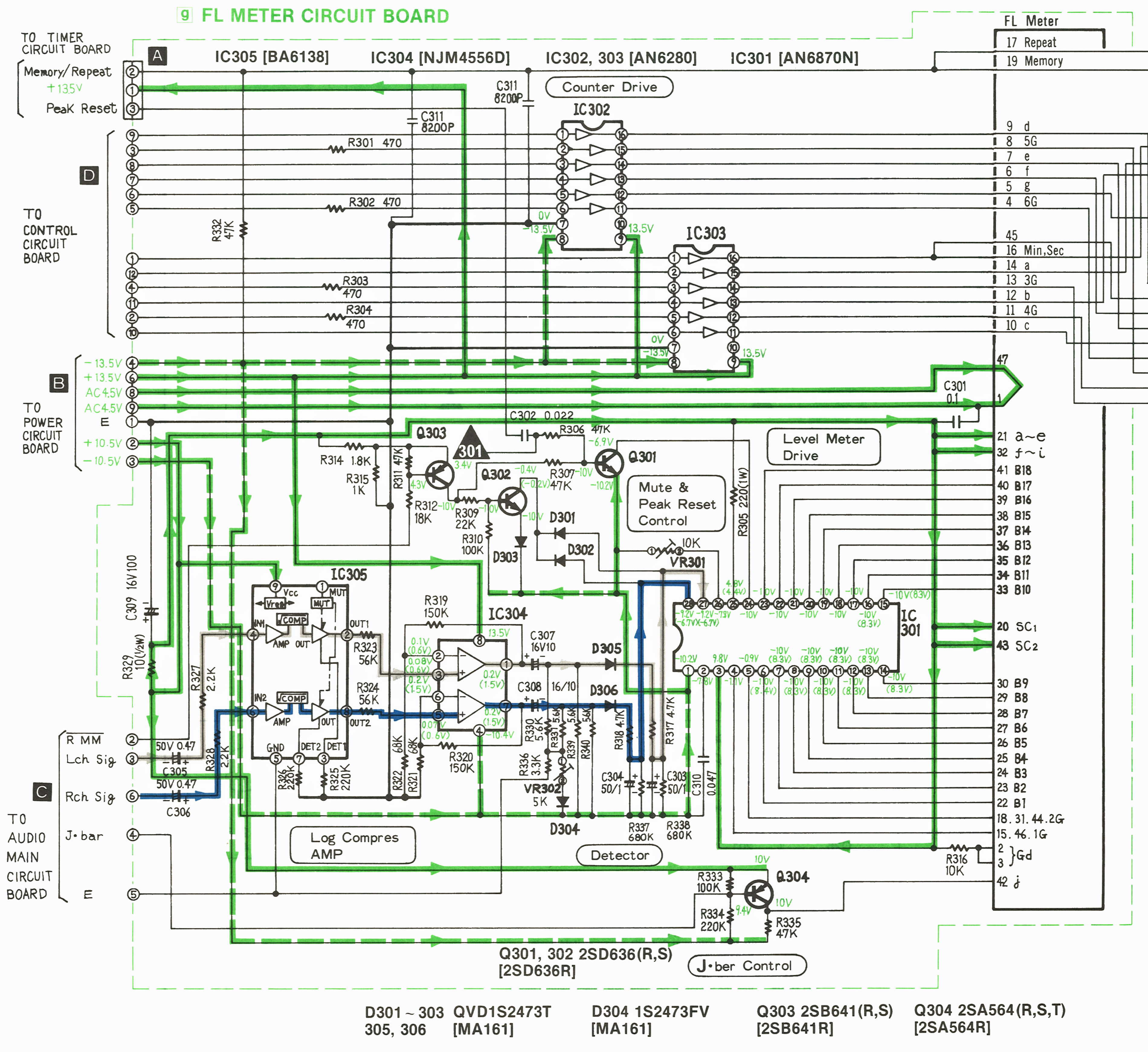
D501 ~ 510, 511 ~ 514
QVD1S2473T
[MA161]

IC501
[MN1405RH]

Q506
[2SD636R]

IC502
[AN6270]

FL METER SECTION


g FL METER CIRCUIT BOARD
TO TIMER CIRCUIT BOARD
Memory/Repeat
Peak Reset
IC305 [BA6138]
IC304 [NJM4556D]
IC302, 303 [AN6280]
IC301 [AN6870N]
FL Meter
17 Repeat
19 Memory
Counter Drive
IC302
IC303
TO CONTROL CIRCUIT BOARD
TO POWER SUPPLY CIRCUIT BOARD
Level Meter Drive
Mute & Peak Reset Control
IC305
IC304
IC 301
Log Compres AMP
Detector
J·ber Control
TO AUDIO MAIN CIRCUIT BOARD
R MM
Lch Sig
Rch Sig
J·ber

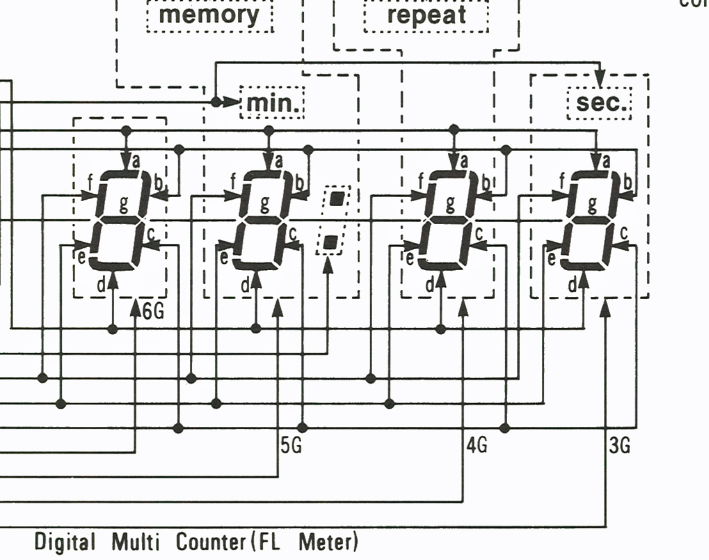
Q301, 302 2SD636(R,S)
[2SD636R]

D301 ~ 303 QVD1S2473T
305, 306 [MA161]

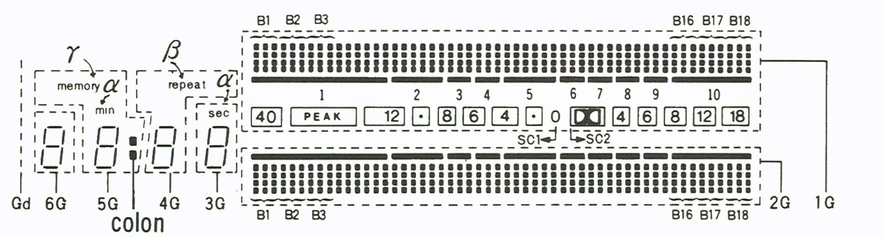
D304 1S2473FV
[MA161]

Q303 2SB641(R,S)
[2SB641R]

Q304 2SA564(R,S,T)
[2SA564R]

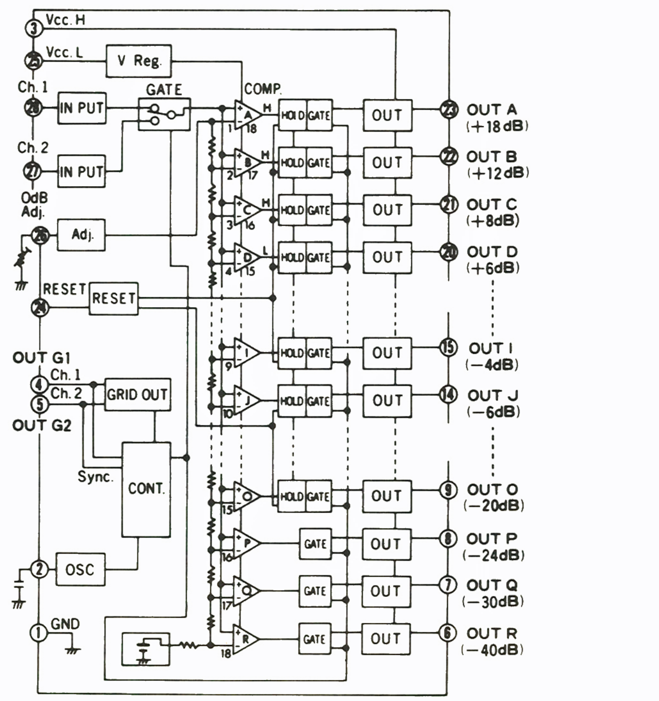

memory
repeat
min.
sec.
Digital Multi Counter (FL Meter)

GRID TERMINATION (FL METER)



EQUIVALENT CIRCUIT

IC301 AN6870N


V Reg
COMP
GATE
HOLD
OUT
RESET
GRID OUT
Sync
CONT.
OSC
GND
OUT A (+18dB)
OUT B (+12dB)
OUT C (+8dB)
OUT D (+6dB)
OUT I (−4dB)
OUT J (−6dB)
OUT O (−20dB)
OUT P (−24dB)
OUT Q (−30dB)
OUT R (−40dB)

NOTES:

- VR301. . . . FL meter adjustment VR (For 0 dB indication)
- VR302. . . . FL meter adjustment VR (For −40 dB indication)
- VR501. . . . Input scanning time adjustment VR
- S501 . . . . . Counter reset switch
- S502 . . . . . Pause switch
- S503 . . . . . Record switch
- S504 . . . . . Stop switch
- S505 . . . . . Playback switch
- S506 . . . . . Fast Forward switch
- S507 . . . . . Rewind switch
- S508 . . . . . Record mute switch
- S509 . . . . . Memory repeat switch
- S510 . . . . . Tape/Time select switch
- S511 . . . . . Set switch
- S512 . . . . . Music select switch
- S513 . . . . . Timer switch (shown in REC position: (1) REC, (2) OFF, (3) PLAY)
- S601 . . . . . Accidental erase prevention switch
- S602 . . . . . Mode switch
- S603 . . . . . Stop switch
- S604 . . . . . Playback switch
- S605 . . . . . Cassette detection switch

} Mode sensing switches

- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000 (Ω), 1M = 1,000 k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ▼ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position.
  However, the voltae in record mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM.
- (🟩) indicates B + (bias)
- (🟩) indicates B − (bias)
- (▨) indicates the flow of the playback signal (dbx out)
- (🟦) indicates the flow of the recording signal (dbx out)
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors are diodes.
  One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q1
2SC1844(E,F) ◀— Production parts number
[2SC1844E] ◀—— Supply parts number
D301
QVD1S2473T ◀— Production parts number
[MA161] ◀—— Supply parts

- The supply parts number is described alone in the replacement parts list.

- **This schematic diagram may be modified at any time with the development of new technology.**

CIRCUIT BOARDS

n MECHANISM CONTROL CIRCUIT BOARD

Q502 [2SB643R]

B	5.28V (5.28V)
C	0.03V (0.03V)
E	1.40V (1.40V)

Q504 [2SB643R]

B	5.28V (5.28V)
C	0.03V (0.03V)
E	1.31V (1.31V)

Q505 [2SB643R]

B	5.28V (5.28V)
C	1.10V (1.10V)
E	1.30V (1.30V)

Q503 [2SB643R]

B	5.28V (5.28V)
C	0.03V (0.03V)
E	1.40V (1.40V)

Q501 [2SB643R]

B	— (——)
C	— (——)
E	— (——)

Q506 [2SD636R]

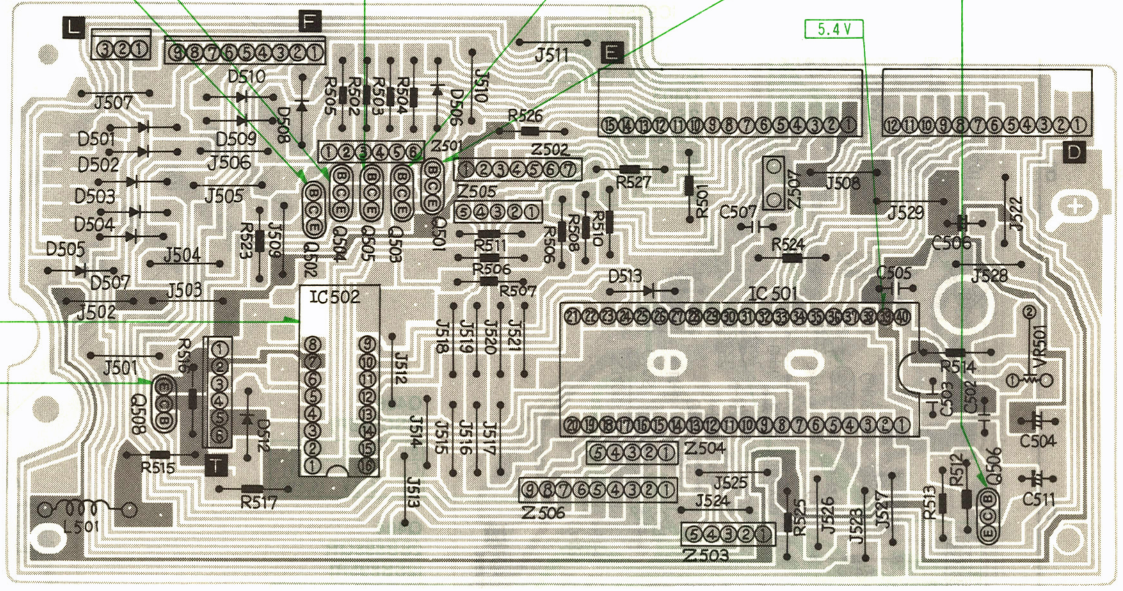
B	0 V (0 V)
C	5.18V (5.18V)
E	0 V (0 V)

IC502 [AN6270]

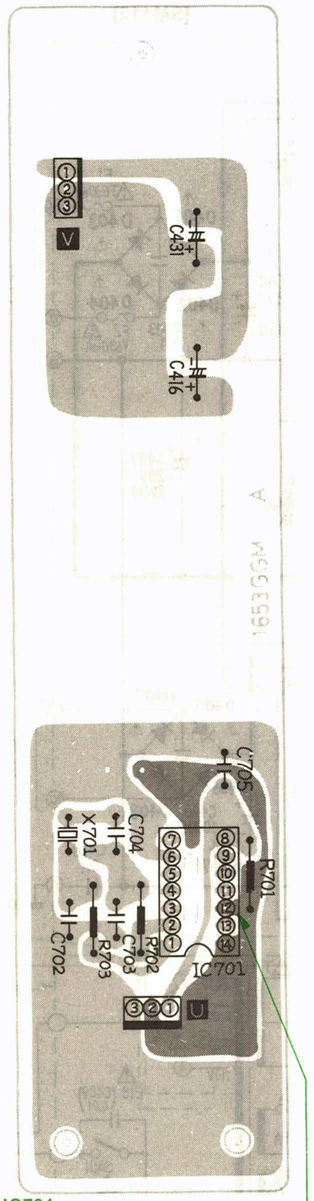
1	8.7V (8.55V)
2	— (—)
3	8.6V (—)
4	13.5V (13.4V)
5	13.5V (13.4V)
6	— (—)
7	5.4V (5.4V)
8	— (—)
9	— (—)
10	— (—)
11	— (—)
12	— (—)
13	— (—)
14	5.12V (5.12V)
15	— (—)
16	13.5V (13.5V)

Q508 [2SD965]

B	6.11V (6.10V)
C	5.43V (5.42V)
E	5.43V (5.42V)


L
F
E
D
T
5.4V
IC502
IC501
J511
D510
D501
D502
D503
D504
D505
D507
D509
D513
J502
J503
J504
J505
J506
J507
J529
J528
Z501
Z502
Z503
Z504
Z505
Z506
Q508
R515
R517
L501
C504
C505
C506
C507
C511
VR501

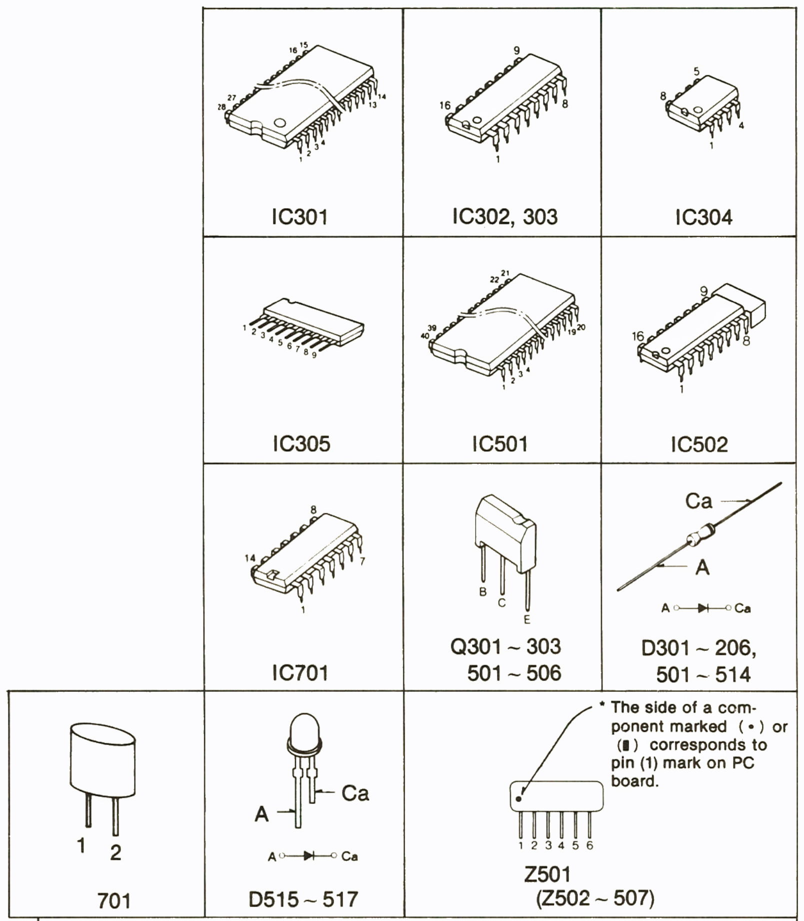
h QUARTZ CIRCUIT BOARD


V
U
C431
C416
X701
C704
C702
R703
R702
C703
C705
R701
IC701

IC701 [M54816P]

1	— (0.80V)	8	2.27V (2.27V)
2	0.72V (0.72V)	9	— (—)
3	— (—)	10	— (—)
4	— (—)	11	— (—)
5	— (—)	12	4.56V (4.57V)
6	0 V (0 V)	13	— (—)
7	— (—)	14	4.56V (4.57V)

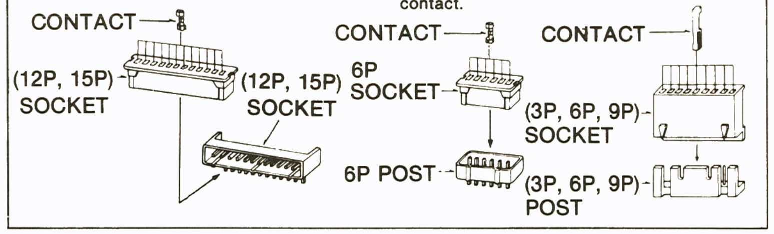
TERMINATIONS


IC301
IC302, 303
IC304
IC305
IC501
IC502
IC701
B
C
E
Q301 ~ 303
501 ~ 506
Ca
A
A Ca
D301 ~ 206,
501 ~ 514
1 2
701
A
Ca
A Ca
D515 ~ 517
1 2 3 4 5 6
Z501
(Z502 ~ 507)

* The side of a component marked (•) or (▮) corresponds to pin (1) mark on PC board.

Removing contacts

Push the pawl of a contact in each hole in the housing with a flat bladed screwdriver and pull its lead wire to remove the contact.


CONTACT
(12P, 15P) SOCKET
(12P, 15P) SOCKET
CONTACT
6P SOCKET
6P POST
CONTACT
(3P, 6P, 9P) SOCKET
(3P, 6P, 9P) POST

g FL METER CIRCUIT BOARD

IC302 AN6280

1	— (—)	9	13.5V (13.5V)
2	— (—)	10	0 V (0 V)
3	— (—)	11	— (—)
4	— (—)	12	— (—)
5	— (—)	13	— (—)
6	— (—)	14	— (—)
7	0.00V (0 V)	15	— (—)
8	−13.5V (−13.5V)	16	— (—)

IC303 AN6280

1	— (—)	9	13.5V (13.5V)
2	— (—)	10	0 V (0 V)
3	— (—)	11	— (—)
4	— (—)	12	— (—)
5	— (—)	13	— (—)
6	— (—)	14	— (—)
7	0 V (0 V)	15	— (—)
8	−13.5V (−13.5V)	16	— (—)

Q303 [2SB641R]

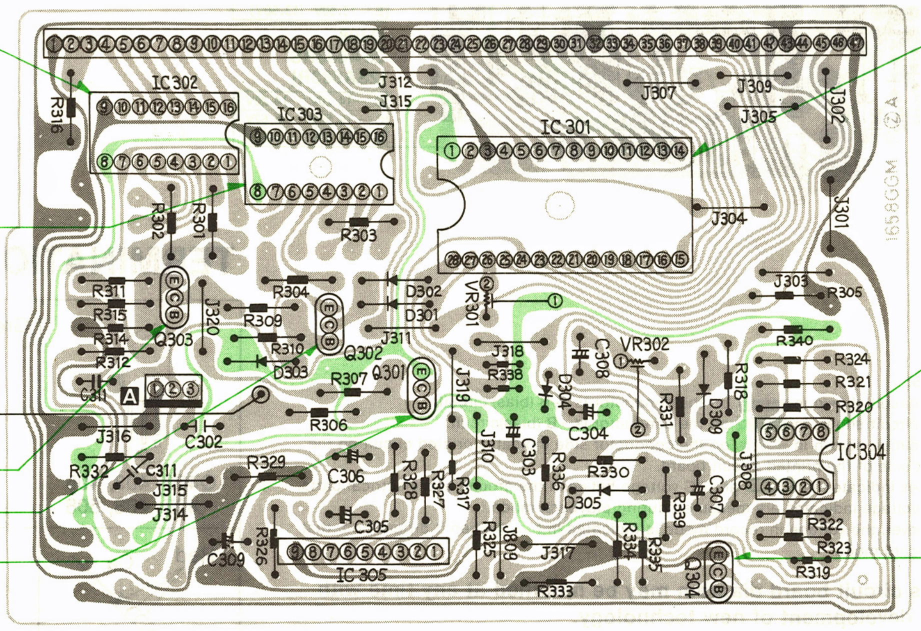
B	4.27V (4.27V)
C	−10.11V (−10.11V)
E	3.40V (3.39V)

Q302 [2SD636R]

B	−10.13V (−10.13V)
C	−0.40V (−0.20V)
E	−9.99V (−9.96V)

Q301 [2SD635R]

B	−10.06V (−10.06V)
C	−6.85V (−6.85V)
E	−10.23V (−10.23V)


TP301
IC301
IC302
IC303
IC304
IC305
Q301
Q302
Q303
Q304
VR301
VR302
J301
J302
J303
J304
J305
J307
J309
J311
J312
J315
J316
J317
R301
R302
R303
R304
R306
R309
R310
R311
R316
R319
R320
R321
R322
R323
R324
R329
R330
R333
R340
C302
C304
C305
C306
C308
C309
C311
D301
D302
D303
D304
D305

IC301 AN6870N

1	−10.25V (−10.23V)	15	−10.11V (8.33V)
2	−7.79V (−7.78V)	16	〃 (8.33V)
3	9.87V (9.83V)	17	〃 (−10.08V)
4	−1.16V (−1.12V)	18	−10.10V (〃)
5	−0.94V (−0.94V)	19	〃 (〃)
6.	−10.12V (8.41V)	20	〃 (〃)
7	−10.13V (8.33V)	21	−10.12V (−10.07V)
8	−10.12V (8.31V)	22	−10.13V (−10.09V)
9	〃 (〃)	23	−10.13V (−10.10V)
10	〃 (〃)	24	−10.24V (−10.22V)
11	〃 (〃)	25	4.81V (4.40V)
12	〃 (〃)	26	−7.76V (−7.75V)
13	〃 (8.32V)	27	−9.21V (−6.68V)
14	〃 (8.33V)	28	−9.23V (−6.69V)

IC304 NjM4556D

1	0.20V (1.50V)
2	0.09V (0.6V)
3	0.08V (0.6V)
4	−10.4V (−10.4V)
5	0.07V (0.59V)
6	0.07V (0.60V)
7	0.17V (1.5V)
8	13.5V (13.5V)

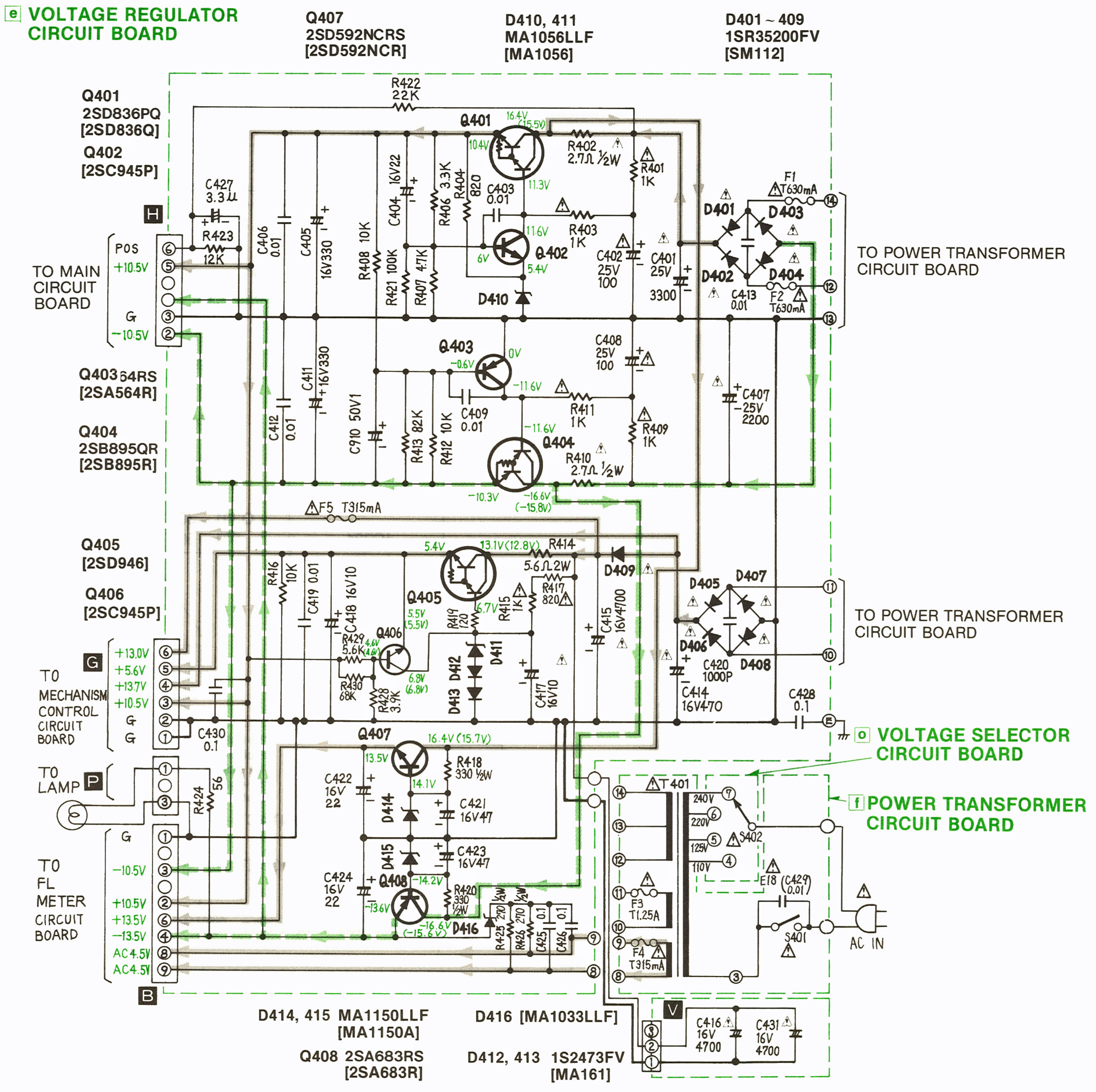
Q304 [2SA564R]

B	9.35V (9.35V)
C	9.96V (9.96V)
D	10.0V (10.0V)

NOTES:
- The circuit shown in ▨ on the conductor is B + (bias) circuit.
- The circuit shown in 🟩 on the conductor is B − (bias) circuit.
- Values indicated in ☐ are under no signal condition and playback mode with volume control at minimum position otherwise specified.
  However, the voltage in record mode is indicated in ( )
  For measurement use VTVM
- **This circuit board diagram may be modified at any time with the development of new technology.**

SCHEMATIC DIAGRAM

POWER SUPPLY SECTION

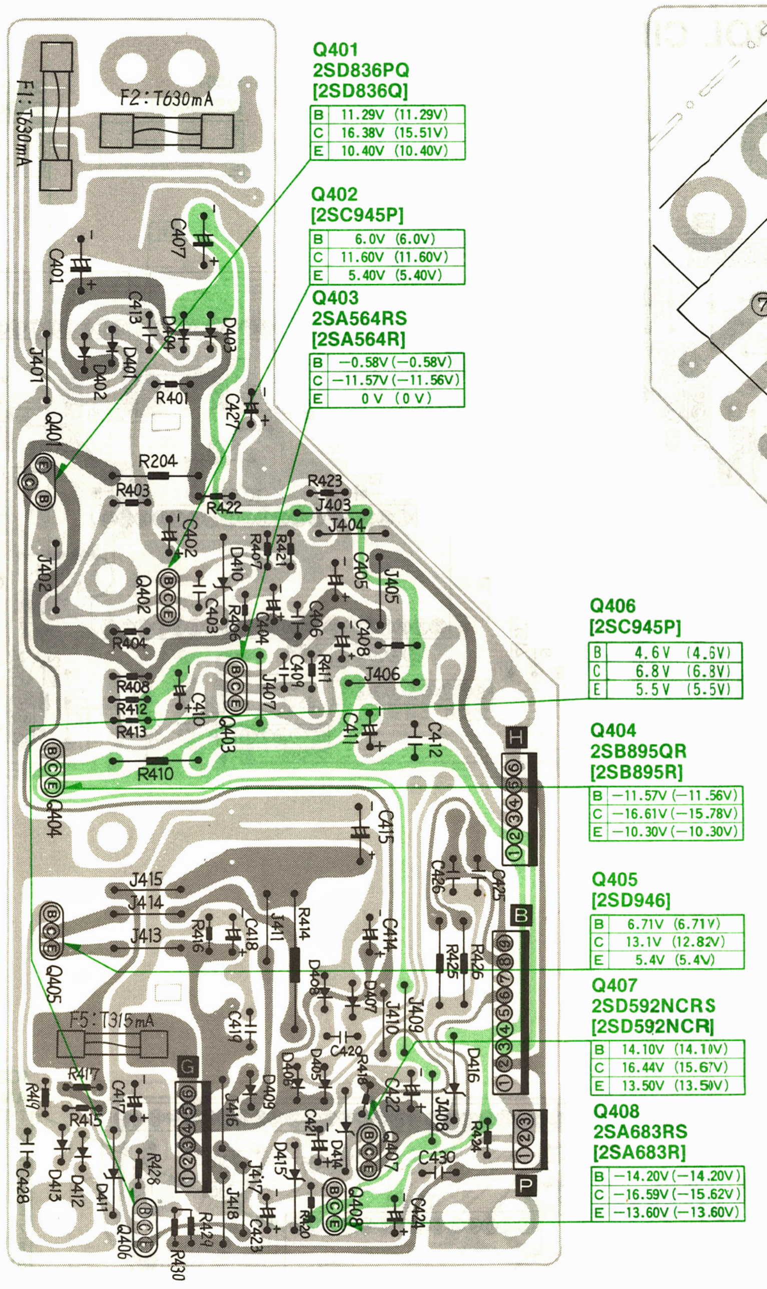

e VOLTAGE REGULATOR CIRCUIT BOARD
Q407 2SD592NCRS [2SD592NCR]
D410, 411 MA1056LLF [MA1056]
D401 ~ 409 1SR35200FV [SM112]
Q401 2SD836PQ [2SD836Q]
Q402 [2SC945P]
Q403 2SA564RS [2SA564R]
Q404 2SB895QR [2SB895R]
Q405 [2SD946]
Q406 [2SC945P]
H
TO MAIN CIRCUIT BOARD
POS +10.5V G −10.5V
G
TO MECHANISM CONTROL CIRCUIT BOARD
+13.0V +5.6V +13.7V +10.5V G G
TO LAMP
P
TO FL METER CIRCUIT BOARD
G −10.5V +10.5V +13.5V −13.5V AC4.5V AC4.5V
B
TO POWER TRANSFORMER CIRCUIT BOARD
TO POWER TRANSFORMER CIRCUIT BOARD
o VOLTAGE SELECTOR CIRCUIT BOARD
f POWER TRANSFORMER CIRCUIT BOARD
AC IN
S401
S402
T401
240V 220V 125V 110V
F1 T630mA
F2 T630mA
F3 T1.25A
F4 T315mA
F5 T315mA
E18
C429 0.01
V
C416 16V 4700
C431 16V 4700
R422 22K
R402 2.7Ω ½W
R401 1K
R403 1K
R410 2.7Ω ½W
R411 1K
R409 1K
R414 5.6Ω 2W
R417 820
R418 330 ½W
R420 330 ½W
R423 12K
R424 56
C427 3.3μ
C402 25V 100
C401 25V 3300
C407 25V 2200
C408 25V 100
C413 0.01
C414 16V470
C420 1000P
C428 0.1
C430 0.1
C421 16V47
C422 16V 22
C423 16V47
C424 16V 22
D414, 415 MA1150LLF [MA1150A]
D416 [MA1033LLF]
Q408 2SA683RS [2SA683R]
D412, 413 1S2473FV [MA161]

NOTES:
- S401. . . . Power ON/OFF switch.
- S402. . . . AC power voltage select switch
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K = 1,000 (Ω), 1M = 1,000 k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- All voltage values shown in circuitry are under no signal condition and playback mode with volume control at minimum position. However, the voltage in record mode is indicated in ( ). For measurement use VTVM.
- (▨) indicates B + (bias).
- (🟩) indicates B − (bias).

- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors are diodes. One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q1
  2SC1844(E,F)◄Production parts number
  [2SC1844E]◄—Supply parts number
  D301
  QVD1S2473T◄Production parts number
  [MA161]◄——Supply parts
- The supply parts number is described alone in the replacement parts list.
- **This schematic diagram may be modified at any time with the development of new technology.**

CIRCUIT BOARDS

POWER SUPPLY CIRCUIT BOARD


F1:T630mA
F2:T630mA
F5:T315mA
H
B
G
P
C401 C407 C402 C403 C404 C405 C406 C408 C409 C410 C411 C412 C413 C414 C415 C417 C418 C419 C420 C421 C422 C423 C425 C426 C428 C430
R204 R401 R403 R404 R406 R408 R410 R411 R412 R413 R414 R415 R416 R417 R419 R421 R422 R423 R425 R428 R429 R430
J401 J402 J403 J404 J405 J406 J407 J409 J410 J413 J414 J415 J416 J417 J418
D401 D402 D403 D404 D405 D408 D409 D410 D411 D412 D413 D415 D416
Q401 Q402 Q403 Q404 Q405 Q406 Q407 Q408

Q401
2SD836PQ
[2SD836Q]

B	11.29V (11.29V)
C	16.38V (15.51V)
E	10.40V (10.40V)

Q402
[2SC945P]

B	6.0V (6.0V)
C	11.60V (11.60V)
E	5.40V (5.40V)

Q403
2SA564RS
[2SA564R]

B	−0.58V (−0.58V)
C	−11.57V (−11.56V)
E	0 V (0 V)

Q406
[2SC945P]

B	4.6V (4.6V)
C	6.8V (6.8V)
E	5.5V (5.5V)

Q404
2SB895QR
[2SB895R]

B	−11.57V (−11.56V)
C	−16.61V (−15.78V)
E	−10.30V (−10.30V)

Q405
[2SD946]

B	6.71V (6.71V)
C	13.1V (12.82V)
E	5.4V (5.4V)

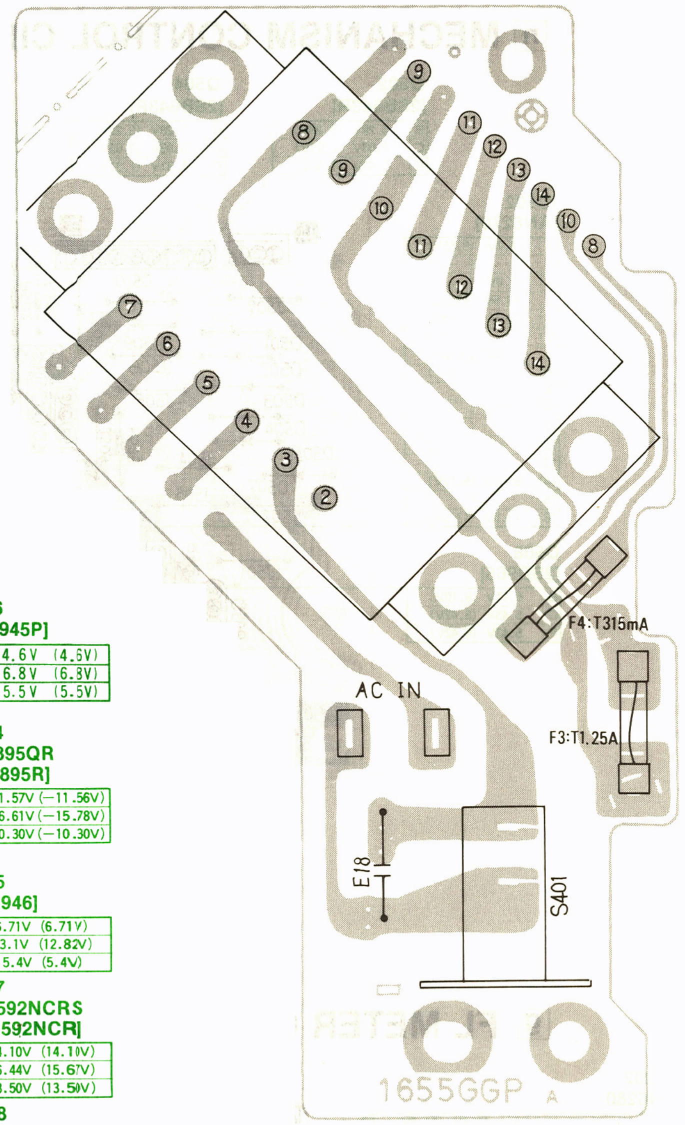
Q407
2SD592NCRS
[2SD592NCR]

B	14.10V (14.10V)
C	16.44V (15.67V)
E	13.50V (13.50V)

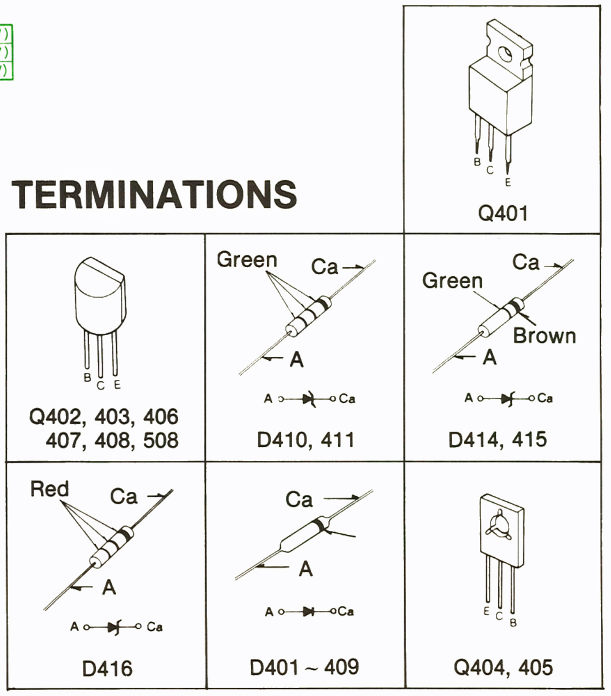
Q408
2SA683RS
[2SA683R]

B	−14.20V (−14.20V)
C	−16.59V (−15.62V)
E	−13.60V (−13.60V)

TRANSFORMER CIRCUIT BOARD


F4:T315mA
AC IN
F3:T1.25A
E18
S401
1655GGP

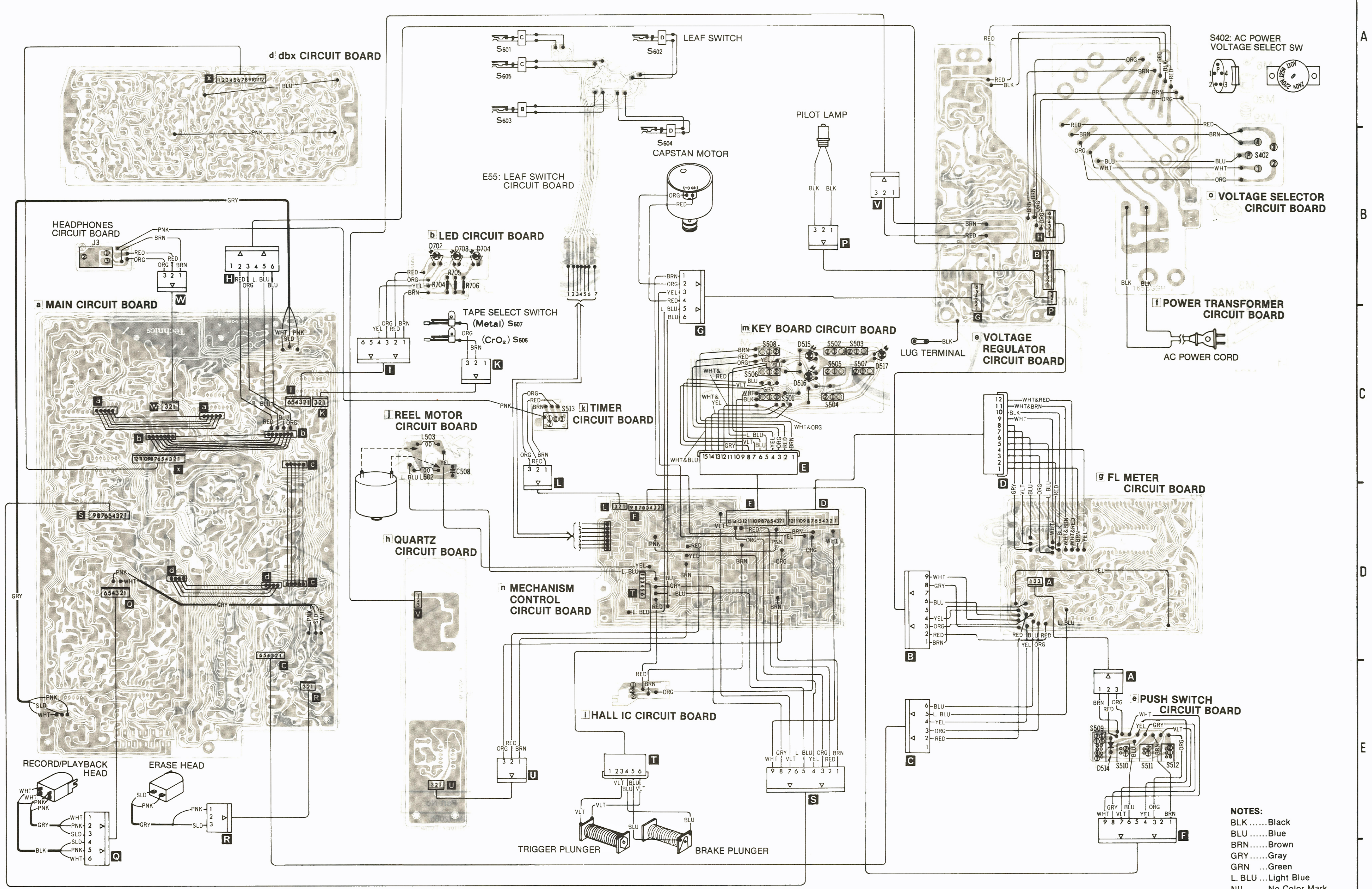
TERMINATIONS


Q401
B C E
Q402, 403, 406 407, 408, 508
Green
Ca
A
D410, 411
Green
Ca
Brown
A
D414, 415
Red
Ca
A
D416
Ca
A
D401 ~ 409
E C B
Q404, 405

NOTES:
- The circuit shown in ▨ on the conductor is + B (bias) circuit.
- The circuit shown in 🟩 on the conductor is −B (bias)circuit.
- The circuit shown in ▨ on the conductor side indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ☐ are DC voltage between the ground and electrical parts.
- The voltage indicates are measured during playback mode. However, the voltage in record mode is indicates in ( ) when it differs from that in record mode.

- **This circuit board diagram may be modified at any time with the development of new technology.**

WIRING CONNECTION DIAGRAM


8
7
6
5
4
3
2
1
A
B
C
D
E
F
d dbx CIRCUIT BOARD
S601
S605
S603
S602
LEAF SWITCH
S604
CAPSTAN MOTOR
E55: LEAF SWITCH CIRCUIT BOARD
PILOT LAMP
S402: AC POWER VOLTAGE SELECT SW
o VOLTAGE SELECTOR CIRCUIT BOARD
HEADPHONES CIRCUIT BOARD
J3
a MAIN CIRCUIT BOARD
b LED CIRCUIT BOARD
D702
D703
D704
R705
R704
R706
TAPE SELECT SWITCH
(Metal) S607
(CrO₂) S606
m KEY BOARD CIRCUIT BOARD
LUG TERMINAL
e VOLTAGE REGULATOR CIRCUIT BOARD
f POWER TRANSFORMER CIRCUIT BOARD
AC POWER CORD
j REEL MOTOR CIRCUIT BOARD
k TIMER CIRCUIT BOARD
S513
L503
C508
g FL METER CIRCUIT BOARD
h QUARTZ CIRCUIT BOARD
n MECHANISM CONTROL CIRCUIT BOARD
i HALL IC CIRCUIT BOARD
c PUSH SWITCH CIRCUIT BOARD
S509
S510
S511
S512
D514
RECORD/PLAYBACK HEAD
ERASE HEAD
TRIGGER PLUNGER
BRAKE PLUNGER

NOTES:

BLK ......Black

BLU ......Blue

BRN ......Brown

GRY ......Gray

GRN ...Green

L. BLU ...Light Blue

NIL ......No Color Mark

ORG ...Orange

PNK ......Pink

RED ......Red

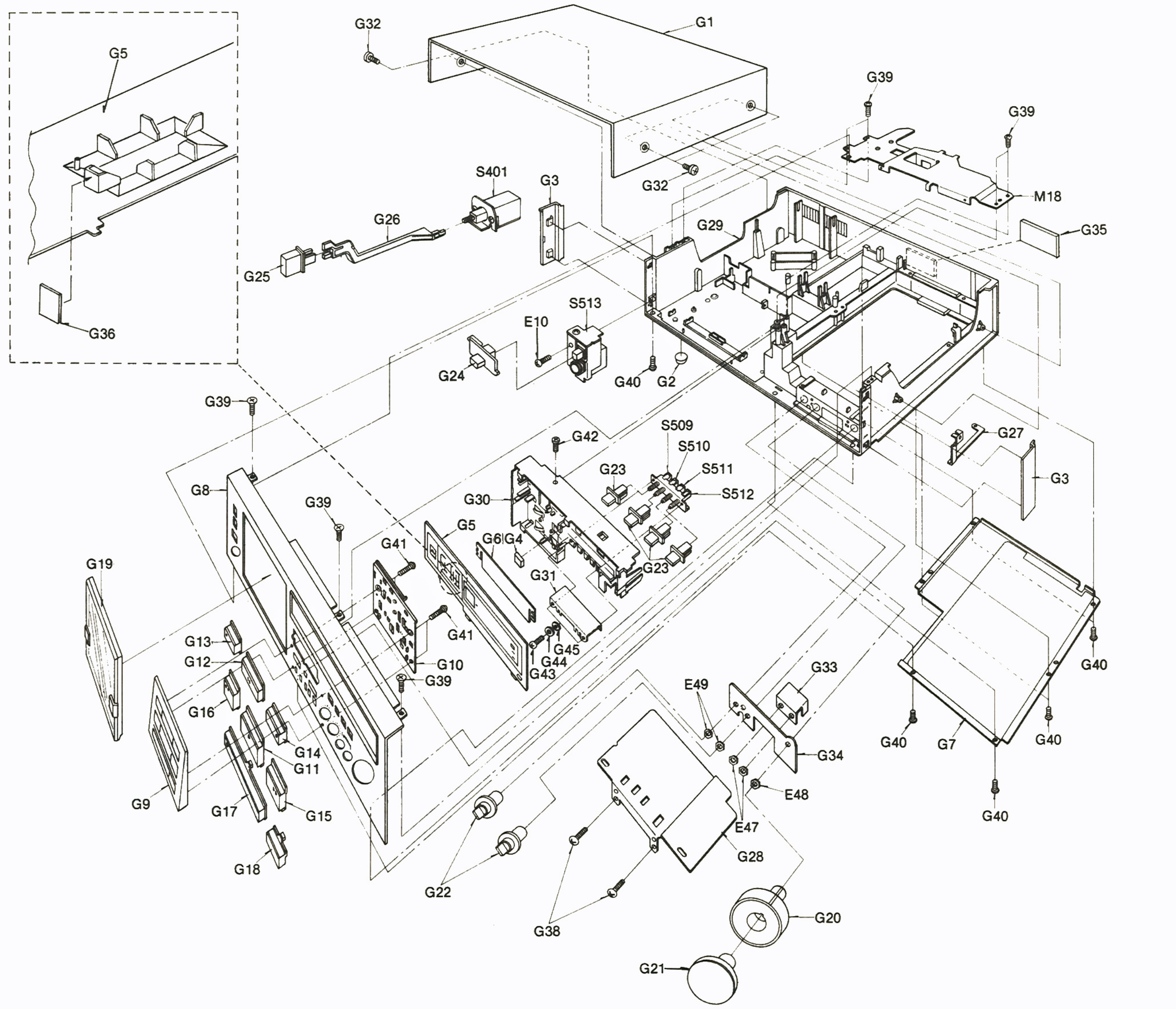
SLD ......Shield Wire

VLT ......Violet

WHT......White

YEL ......Yellow

CABINET PARTS LOCATION

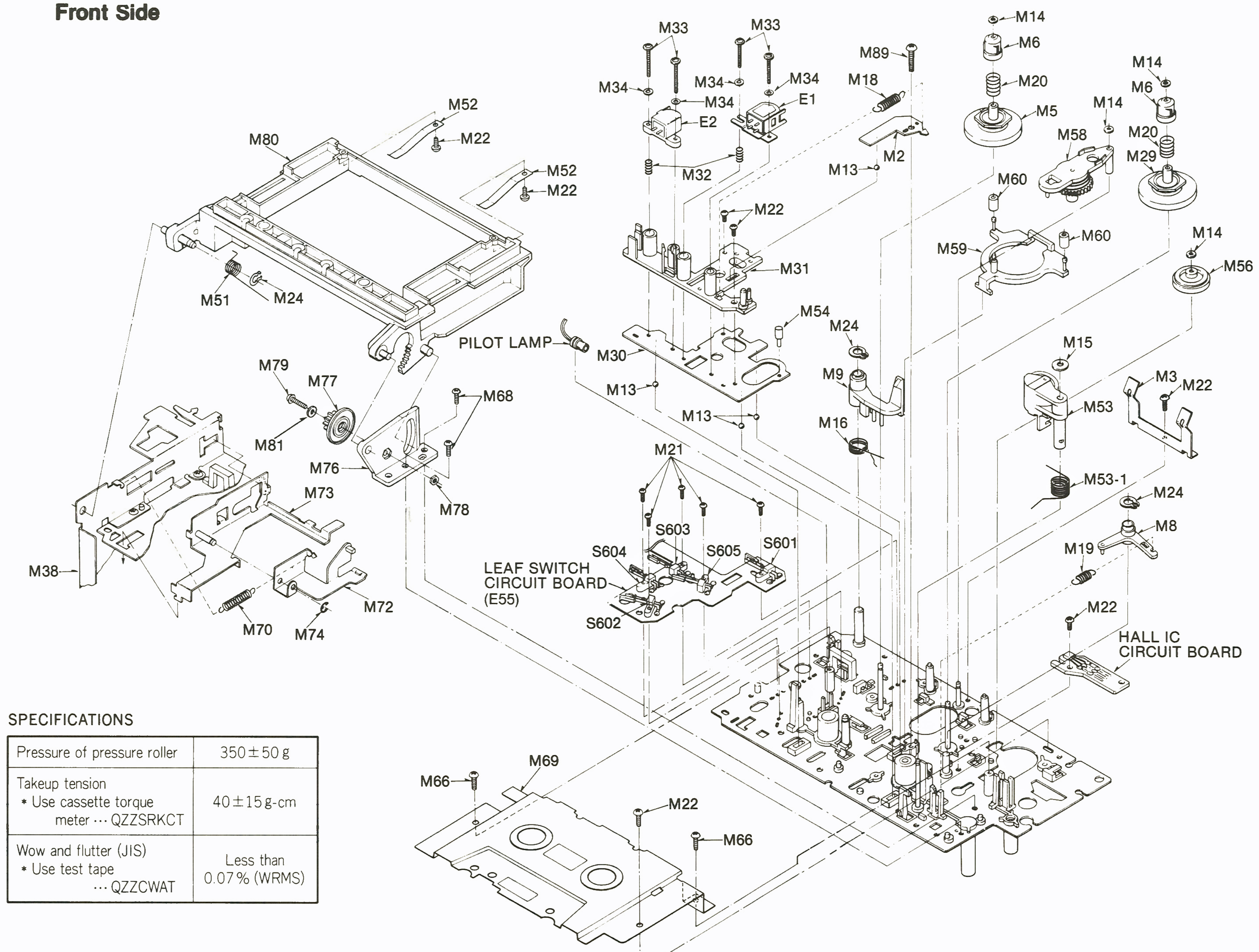

G1
G2
G3
G5
G8
G9
G10
G11
G12
G13
G14
G15
G16
G17
G18
G19
G20
G21
G22
G23
G24
G25
G26
G27
G28
G29
G30
G31
G32
G33
G34
G35
G36
G38
G39
G40
G41
G42
G43
G44
G45
G6
G4
S401
S509
S510
S511
S512
S513
E10
E47
E48
E49
M18

REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
CABINET PARTS		
G 1	QGCM0058 “Silver Type”	Case Caver
	QGCM0058K “Black Type”	Case Cover
G 2	QKA1086	Case Foot
G 3	QGK3201 “Silver Type”	Side Board
	QGK3201K “Black Type”	Side Board
G 4	QBG1736	P.B Cushion
G 5	QGK3223D “Silver Type”	Meter Cover
	QGK3223K “Black Type”	Meter Cover
G 6	QGL1174	Filter
G 7	QYB0411	Button Cover Assembly
G 8	QYP1084 “Silver Type”	Front Panel Assembly
	QYP1085 “Black Type”	Front Panel Assemlbly
G 9	QGK3222B “Silver Type”	Operation Panel
	QGK3222K “Black Type”	Operation Panel
G 10	QKJ0518	Push Button Holder
G 11	QXB0758	Operation Button (Play)
G 12	QXB0759	Operation Button (Pause)
G 13	QXB0760	Operation Button (Record)
G 14	QGO1990 “Silver Type”	Operation Button (Rec-Mute)
	QGO1990Y “Black Type”	Operation Button (Rec Mute)
G 15	QGO1991 “Silver Type”	Operation Button (Fast Forward)
	QGO 1991Y “Black Type”	Operation Button (Fast Forward)
G 16	QGO1993 “Silver Type”	Operation Button (Rewind)
	QG01993Y “Black Type”	Operation Button (Rewind)
G 17	QGO1994 “Silver Type”	Operation Button (Stop)
	QG01994Y “Black Type”	Operation Button (Stop)
G 18	QGO1995	Push Button (Counter Reset)
G 19	QYF0542 “Silver Type”	Cassette Lid Assembly
	QYF0542K “Black Type”	Cassette Lid Assembly
G 20	QYT0636	Volume Knob-R
G 21	QYT0637	Volume Knob-L
G 22	QGT1569	Select Knob
G 23	QGO2043	Function Button
G 24	QGO2042	Timer Buttom
G 25	QGO1900	Power Button
G 26	QMR1986	Power Rod
G 27	QJC0049	Earth Plate-A
G 28	QTS1579	Shield Plate
G 28	QTS1576	Meter Shield Plate
G 29	QKM1512	Main Case Asembly
G 30	QMK1959	Sub Chassis
G 31	QTW1279	Meter Insulating Plate
G 32	XTB4 + 8BFN “Silver Type”	Screw ⊕4×8
	XTB4 + 8BFZ “Black Type”	Screw ⊕4×8
G 33	QTS1575	Microphone Shield Plate
G 34	QMA4363	Volume Angle
G 35	[B] QGS2975 [For United Kingdom.]	Main Name Plate
G 36	QBH2012	Cover Cushion
G 38	XTN3 + 10B	Tapping Screw
G 39	XTS3 + 12B	Tapping Screw
G 40	XTN3 + 10B	Tapping Screw
ACCESSORIES		
A 1	RP023A	Connection Card
A 2	[D] QQT3217 [For all European areas except United Kingdom.]	Instruction Book
	[B] QQT3218 [For United Kingdom.]	Instruction Book
PACKINGS		
P 1	QPN4290	Inside Carton
P 2	QPA0654	Cushion-A
P 3	QPA0655	Cushion-B
P 4	XZB50X65A02	Poly Bag
P 5	QPS0618	Pad
P 6	QPC0072	Sheet
P 7	QPA0662	Spacer

MECHANISM PARTS LOCATION

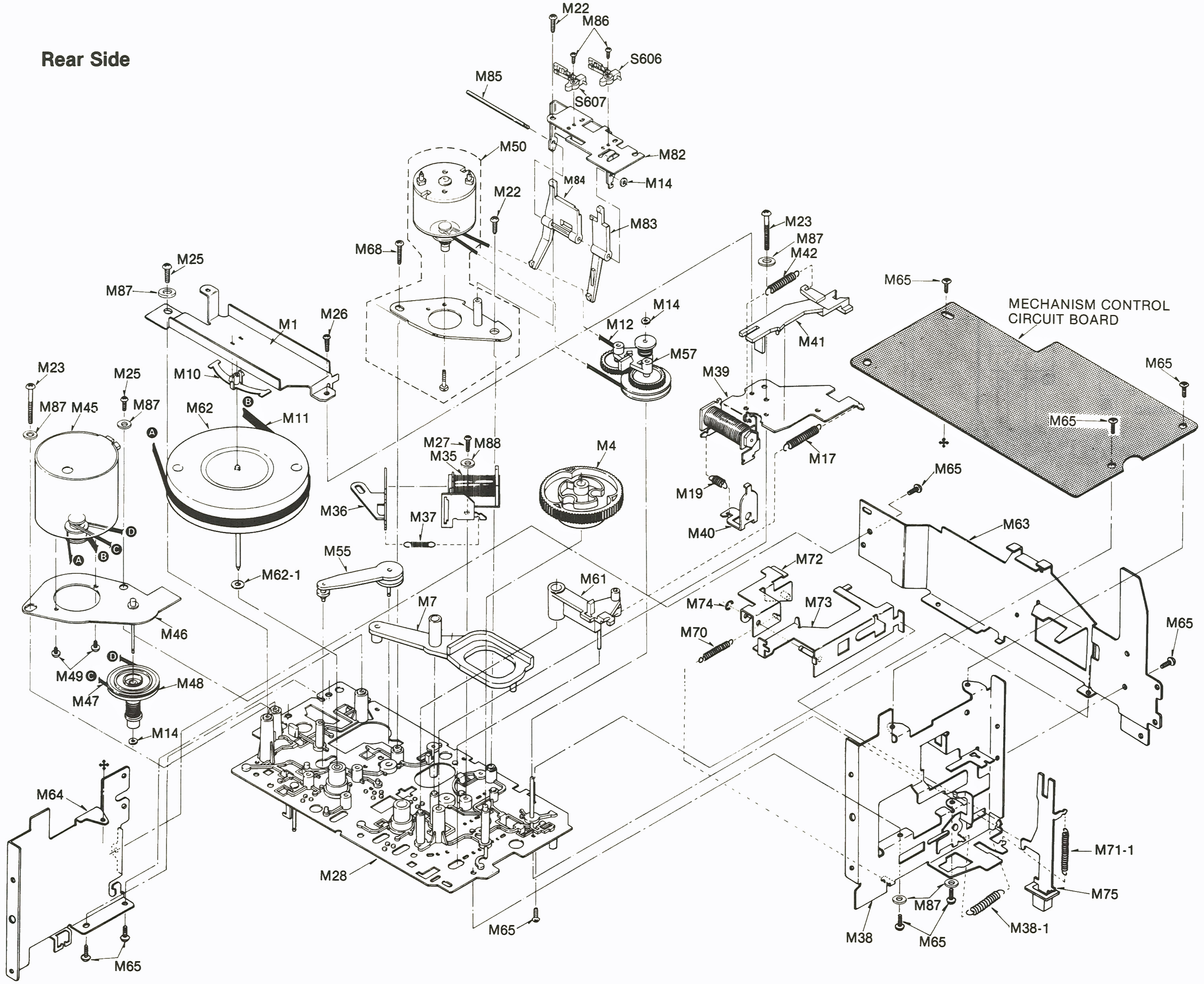
Front Side


M33
M33
M34
M34
M34
M34
E2
E1
M32
M22
M31
M89
M18
M2
M13
M14
M6
M20
M5
M14
M6
M20
M58
M29
M60
M59
M60
M14
M56
M52
M22
M80
M52
M22
M51
M24
PILOT LAMP
M30
M54
M24
M9
M16
M13
M13
M15
M53
M3
M22
M53-1
M24
M8
M19
M22
HALL IC
CIRCUIT BOARD
M79
M77
M81
M68
M76
M73
M78
M38
M70
M74
M72
M21
S603
S604
S605
S601
LEAF SWITCH
CIRCUIT BOARD
(E55)
S602
M69
M66
M22
M66

SPECIFICATIONS

Pressure of pressure roller	350±50g
Takeup tension • Use cassette torque meter ··· QZZSRKCT	40±15g-cm
Wow and flutter (JIS) • Use test tape ··· QZZCWAT	Less than 0.07% (WRMS)

Rear Side


M22
M86
S606
M85
S607
M82
M14
M50
M84
M22
M83
M68
M23
M87
M42
M65
MECHANISM CONTROL
CIRCUIT BOARD
M25
M87
M1
M26
M14
M12
M57
M41
M65
M23
M25
M10
M87
M45
M87
M62
M11
M39
M65
M27
M88
M35
M4
M17
M65
M36
M37
M19
M40
M63
M55
M62-1
M61
M72
M74
M73
M7
M70
M65
M46
M49
M47
M48
M14
M64
M28
M71-1
M75
M65
M87
M38
M65
M38-1
M65
A
B
C
D

REPLACEMENT PARTS LIST

Ref No.	Part No.	Part Name & Description
	MECHANICAL PARTS	
M 1	QMA4330	Flywheel Retainer
M 2	QBP1894	Head Base Plate Spring
M 3	QBP1895	Cassette Pressure Spring
M 4	QXG1059	Maim Gear
M 5	QDR1146	Supply Reel Table
M 6	QMB1336	Reel Table Hub
M 7	QML3655	Cam Follower
M 8	QML3660	Idler Select Lever
M 9	QML3661	Erase Safety Lever
M 10	QMZ1283	Flywheel Thrust Retainer
M 11	QDB0306	Capstan Belt
M 12	QDB0287	Reel Motor Belt
M 13	QDK1012	Steel Ball
M 14	QBW2008	Snap Washer
M 15	QBW2046	Snap Washer
M 16	QBN1772	Erase Safety Lever Spring
M 17	QBT1725	Lock Lever Spring
M 18	QBT1927	Head Base Plate Spring
M 19	QBT1920	Idler Spring
M 20	QBC1373	Reel Table Spring
M 21	XTN2+6B	Tapping Screw
M 22	XTN26+6BFZ	Tapping Screw
M 22	XTN26+6B	Tapping Screw
M 23	XTN3+24B	Tapping Screw
M 24	XUB4FT	Stop Ring
M 25, 26	XTN3+10B	Tapping Screw
M 27	XTN26+8B	Tapping Screw
M 29	QXD0120	Takeup Reel Table Assembly
M 30	QMK1867	Head Base Plate
M 31	QMZ1252	Head Spacer
M 32	QBC1103	Head Spring
M 33	XSN2+16	Screw ⊕2×16
M 34	XWG2	Washer
M 35	QXA1232	Brake Plunger Assembly
M 36	QML3865	Plunger Lever
M 37	QBT1955	Plunger Spring
M 38	QXA1222	Side Angle Spring
M 38-1	QBT1755	Side Angle Spring
M 39	QXA1076	Trigger Plunger Assembly
M 40	QML3651	Trigger Plunger Lever
M 41	QML3653	Control Lever
M 42	QBT1278	Record Lock Lever Spring
M 45	QXU0280	Capstan Motor Assembly
M 46	QXA1077	Motor Retainer Assembly
M 47	QDB0286	Takeup Belt
M 48	QXP0621	Takeup Pulley
M 49	XSN26+3	Screw ⊕2.6×3
M 50	QXU0250	Reel Motor Assembly
M 51	QBN1878	Holder Spring
M 52	QBP1946	Cassette Lock Spring
M 53	QXL1406	Pressure Roller Lever
M 53-1	QBN1771	Pressure Roller Spring
M 54	QMN2625	Eccentric Pin
M 55	QXL1423	Idler Lever Assemlbly
M 56	QXi0116	Takeup Idler
M 57	QXL1408	Swing Gear Lever Assembly
M 58	QXL1409	Fast Wind Arm Assemlby
M 59	QML3659	Brake Lever
M 60	QBG1132	Brake Rubber
M 61	QXL1411	Lock Lever Assembly
M 62	QXF0190	Flywheel Assembly
M 63	QMA4358	Center Angle
M 64	QMA4359	Side Angle-R
M 65	XTN3+6B	Tapping Screw
M 65	XTN3+8B	Tapping Screw
M 66	XTN26+6BFZ	Tapping Screw
M 68	XTN26+10B	Tapping Screw
M 69	QXH0390 "Silver Type"	Mechanism Cover
	QXH0390K "Black Type"	Mechanism Cover
M 70	QBT1691	Lamp Lever Spring-B
M 71	QBT1566	Intermediate Lever Spring
M 72	QXL1414	lock Lever-A
M 73	QXL1507	Lock Lever-B
M 74	XUC25FT	Stop Ring
M 75	QXR0780	Eject Rod Assembly
M 76	QKJ0499	Dumper Gear Holder
M 77	QDG1254	Dumper Gear
M 78	XNG26	Nut
M 79	XSN26+8B	Screw
M 80	QMH2085 "Silver Type"	Cassette Holder
	QMH2085K "Black Type"	Cassette Holder
M 81	XWG26	Washer
M 82	QMA4072	Auto Tape Selector Angle
M 83	QML3716	Tape Detection Lever (for Normal/CrO_2 Tape)
M 84	QML3717	Tape Detection Lever (for Metal Tape)
M 85	QNM2642	Detection Lever Shaft
M 86	XTN2+5B	Tapping Screw
M 87	XWG3	Washer
M 88	XWG26	Washer
M 89	XTN26+12B	Tapping Screw

ARD
Y.F
D DK B BK
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